The Builder.

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Concrete as a Building Material.

ALTHOUGH satire is reckoned the easiest of all wit, the great master who, in the last century, described the occupations of numerous professors in an unknown academy, dealt a blow to the speculative inventor more enduring than all the encouragement which those who "nature to advantage dressed" have succeeded in giving him. Innate opposition to change,—the mental *cui bono* of the many,—is always strengthened by remembrance that a Laputan "projector," who had been eight years in attempting to supply artificial sunshine at a reasonable rate, expected to succeed after another eight years' experience. How many people spend life in seeking to attain utterly useless results, is a fit subject for the satirist; but as in all things, high and low, many are called and few chosen, so invention obeys the natural law of survival. If the labours of only one inventor in a thousand accrue to the public advantage, and receive public attention, it may be considered certain that the remaining 999 have more or less assisted in his success. Inventions, and even discoveries, however, are not generally made by those who first thought or found them out, paradoxical as the remark may appear. "That man," said Sydney Smith, "is not the discoverer of any art who first says the thing; but he who says it so long and so loud, and so clearly, that he compels mankind to hear him. . . . . Many persons broke stone before Macadam; but Macadam felt the discovery more strongly, stated it more clearly, persevered in it with greater tenacity, wielded his hammer, in short, with greater force than other men, and finally succeeded in bringing his plan into general use." Few technical historians hesitate to admit the truth of a dictum worth remembering by the many devotees of chronic invention. Successive attempts to supplant a natural by an artificial production are thrust forward on the plea of economy in the one, or the difficulty of obtaining the other. One of the oldest of building substances is a natural agglomeration easily accounted for. Easily imitated, the imitation is known in England as "concrete," and in France as "*béton*." In an artistic point of view, its most dangerous competitor is still the original work of nature herself, and that even in countries where her work is rare and deficient. Its most unreasonable critic is not Time, but man. He expects the work of his own hand to surpass in quality that of his Maker. No one ever knew a quarry of natural concrete to be wholly homogeneous, or undivided by horizontal joints, or composed of blocks entirely without blemishes or cracks. But if a wall of artificial concrete 100 yards long display fissures, or bulge out, or contract in substance, the composition is pronounced faulty, and therefore worthless. There are few ordinary building-stones which are not porous, yet if concrete of modern workmanship suck in moisture, neither architect nor builder will have anything to do with it. In the very face of the elements attempts are made to form stone similar to that which was formed in the depths of the earth. Quarrymen know full well that until the stone which they extract has been exposed for a certain time to the sun, and with calcareous stone until a certain chemical action is produced upon its surface by natural heat, it is useless as a building material. Yet man, after simply combining nature's ingredients, expects to compose a homogeneous mass against which atmospheric influence shall be powerless; and often without deigning to submit his composition to those several processes to which nature has humbly submitted her own.

In any discussion upon this subject it is desirable to separate refined concrete,—such as Ransome's Siliceous Stone, and the Patent Victoria Stone in England, and Coignet's "Bétons agglomérés" in France,—from ordinary concrete. The former is a work of art, scientifically prepared, in the almost strict observance of natural laws; the latter is the production to a certain extent of unskilled labour, and it is composed of fixed proportions of prescribed materials. The argument in favour of the one is that it is cheaper than real stone; the arguments in favour of the other are that it is cheaper, and can be made more durable than the best brickwork. More than thirteen years ago Professor Kerr, in a careful paper on "Artificial Stone," repeated what had been advanced in an Institute Prize Essay, written in 1835, that as regards the principle of concrete few can have any doubts. "The process," said the essayist, "is the natural one by which a large portion of the rocks constituting the crust of this our momentary residence has been formed." In the more recent words of the Professor, "Concrete, however used, is *technically* artificial stone; but if it be not (and it too frequently is not *practically* so) a sound, solid, hard, stone-like mass, it is worse than useless." He further argued, and with great force, that as sandstone is nothing more than a concrete of sand, — the cementitious element in it being flint-like, clay-like, or lime-like, according to circumstances,—and as ordinary limestone is carbonate of lime with no sand at all, prepared concrete of the finest description is stone artificially produced. In this form concrete recommends itself to every architect deprived, as Englishmen are, over the larger part of their island, of stone formations. Its only risk, from an æsthetic point of view, of being termed a building sham, runs in the fact that natural stone must be cut, while artificial stone is shaped in a mould.

Ordinary concrete, originally prepared with lime, and now improved by the substitution of Portland cement, is the substance which has occupied professional attention in several meetings of the Royal Institute of British Architects*; but the recent discussions thereon have not been conducted in a way likely to lead to any practical or, indeed, useful result. Patentees and inventors have been allowed to give a loose description of their opposition wares and the means of applying them. The majority of those who have turned their attention to concrete as a material suitable for the superstructure of buildings display a unanimity of disagreement in many of the constructive points which vitally affect its use. Would-be converts to the desirability of its general adoption as a building material are, therefore, left in a maze of perplexity, and cheerfully accept the assurance of Mr. Alexander Payne, who fears that inventors "have not yet done much in striking out a new line for the employment of concrete,—though they have improved the material,—and that by far the most common mode of building still practised is the old method described by Alberti." This was given in the prize essay to which allusion has been already made, as follows:—"Walls formed wholly by concretion were made, like the earthen walls of Spain and Africa, by placing planks at the distance apart of the intended thickness of the walls; between these were poured pebbles, or broken stones, and mortar, and there they were so retained until hardened to a mass." That British architects should be now discussing the feasibility of doing what was actually accomplished in Europe during the early years of the fifteenth century is only a subject of congratulation if but something definite can be got out of the discussion. In June, 1871, Mr. Wonnacott, treating of Portland cement concrete, said that "concrete walls are not found in practice to be weather-proof unless rendered externally in cement, and not waterproof unless trowelled to a smooth surface and kept from extremes of temperature." He also doubted if such concrete were a non-conductor of heat, adding that he knew it was not a non-conductor of sound, and that its advantage over brickwork consisted in offering a better key for the plaster covering. In fine, according to Mr. Wonnacott, "concrete offers great facilities for warming and ventilation. Heated air is readily conveyed through flues, formed in the body of the walls, and admitted into the several rooms through the skirtings." At the same meeting Mr. A. W. Blomfield, architect of a justly-celebrated concrete church at Oxford, said, "In respect of strength and durability, my experience has led me to put the greatest possible faith in carefully-compounded Portland cement concrete. I do not think that its capabilities in the way of fireproof building,

* The discussion upon "Concrete as a Building Material" will be resumed on Monday evening, the 29th inst., at eight o'clock.

without any adventitious aid of iron girders or other supports, over considerable areas, has ever yet been properly tested." In these two last quotations may be said to lie the gist of the matter. Inventors who propose to surpass the powers of nature should remember that she hides her concrete formations; and they must consent, at least for the present, to conceal their imitative efforts in the interior of buildings. If as yet they have only succeeded in providing a substance easy of application to the internal structure of dwelling-houses, they merit the immediate attention of London householders, than whom, perhaps, none in any European capital have greater cause of complaint against the building fraternity.

The common-sense technical view,—that is, the view taken by ordinary architects and builders,—of the application of concrete to the external superstructure of houses is not based upon doubts as to possibility or even economy. At the bottom of most consciences lingers a half regret,—would that it were impossible! There exists, and there always has existed, a love for buildings constructed of stone, and of combinations of brick and stone. There is an undoubted prejudice against the look and even the feel of Portland cement. If, indeed, the realisation of some sanitary Utopia depended only upon the general acceptation of concrete fronts, the growing artistic feeling of the people would experience a sensation of revolt. Nevertheless, everything points to the probability of its general adoption in many situations in cheap tenements, such as those projected under the provisions of the Artisans' Improved Dwellings Act. The contemplated scarcity of bricks may give an impetus to its extended use and inevitable development; and a strike, similar to that of the Paris carpenters in 1840, which resulted in the effectual introduction of iron floors, may be advantageously repeated in this country, in order to hasten the exclusion, not only of naked timbers, but also of naked iron, from every public and private building. In Paris, a fire-resisting concrete floor has long passed the period of discussion; its use is almost traditional; its application familiar to all, and the right of every one. But the French possess plaster, and they seem to do what they like with it. In London, concrete in floors remains a tug of debate, and the speciality of inventors, who do not seem to do what they like with it. The absolute necessity for its invariable use in the insides of houses is overlooked in attempts, often abortive, to employ it in the outsides of them, and that though the English possess a native cement of extraordinary power. In Paris, it is the rule to form concrete floors in different blocks of private residences, as well as in public buildings; in London it is the rule not to do so, either in mansion, villa, or street of houses. There can be no doubt that the economical application of ordinary concrete, such as ordinary workmen can prepare, to the internal distribution of ordinary buildings would afford a great benefit to the public generally, especially in the centre of the metropolis.

The original and legitimate place of lime or cement concrete in the construction not only of foundations, but of vaults, roofs, and floors, remains uncontrovertible; and it is of the utmost importance that these should be, if not fireproof, at least, fire-resisting. It is, therefore, not asking too much of inventors to pause before making statements in direct contradiction of each other. We are told that Portland cement concrete expands and contracts, and that it does neither of these things; that while iron doors twist under the action of fire into every conceivable shape, concrete lintels survive flame and resist heat, and that concrete is not fire-proof. One inventor wants to subvert the art of the joiner and do all in concrete; but let him be content to supersede that of the carpenter. Another puts together cement tiles upon a wood framing, and calls it concrete construction. Of the facts elicited last Monday fortnight, Mr. Brannon's account of cottages which he had purposely fired several times—the concrete remaining each time harder than the last—was of value. This gentlemen, from experience he had had in Derbyshire, stated that iron slag, ground with selenitic lime, was equal to Portland cement concrete; and many people doubtless incline to his opinion. A similar utilisation of slag in the composition of rough concrete cottages and buildings connected with ironworks, calls for the attention of those who build in parts of the country where refuse from the blast furnaces abounds in hideous and hitherto useless heaps. Mr. Tall's statistics relating to the floors and roofs he had built entirely without any iron joists, or even ties were most suggestive. Indeed, the certainty that naked iron is even more dangerous in a fire than hard wood, and the doubts whether iron ought to be embedded in any kind of material whatever, tend to sensibly reduce its employment in the gross construction of ordinary buildings.

The method of constructing floors, roofs, partitions, and even external walls, in iron and concrete, is theoretically wrong if the fixed rule in building be to avoid an admixture of materials. To all practical intents and purposes, however, the French have been right for five-and-thirty years. Their notion is, that the concrete—formed of *platras*, broken brick, or tile "run" in plaster—introduced between wood or iron joists and rafters, not only gives homogeneity, but adds strength. In Paris, architects live and die,—Paris itself has been demolished and rebuilt, without, in round phrases, the fixing of a framed iron girder. Entire façades have been carried upon lintels (of from 7 ft. to 10 ft. bearing) composed of two rolled-iron joists connected by wrought-iron collars, the interstices being filled with hollow brick and cement, or *platras*, run in plaster, and the whole enveloped in a covering of plaster. Whether such lintels be stronger with, whether they would be equally strong without, the admixture of brick or *platras*, cement, or plaster, may remain an open question; but that they would not be equally fire-resisting in their naked condition is certain. In Paris, the iron skeleton is filled and enveloped as a precaution against the effects of fire and the passage of sound. In London, certain patentees undertake to provide floors of the same description with a filling of the more extravagant and infinitely stronger concrete made with cement. But it is impossible not to suspect that by the careful insertion of iron rods or ties, floors of almost any area, and within a maximum thickness of 12 in., could be constructed of such concrete. To this end the attention of inventors cannot be too urgently directed. The almost imminent introduction of a reformed Building Act for the metropolis must lead to compulsory modifications in the present mode of constructing "fireproof" buildings. So-called "fireproof" warehouses, hospitals, and other similar works in London, are now known to be so only in name; naked iron in the midst of the flames is regarded by firemen with more dread than even resinous wood; naked iron in a damp atmosphere depends for sheer existence upon periodical coats of paint; and naked iron under a tropical sky, where Englishmen too often use it, is a chronic source of accident from unavoidable contraction and expansion and electrical effects. As it has been before explained, the French architect has cheap gypsum at his command, and with it he has long counteracted the treacherous proclivities of iron. His London brethren, at a vast expense, and for an equally long time, have resorted to heavy and cumbersome blocks of fireclay as the best and only ready envelope for it. But in the face of cut-and-dried rules of theory, the practice, successfully tried abroad, of entirely covering iron with some kind of concrete, is a wise and profitable precaution, by the exercise of which the French capital enjoys, in quiet times, comparative immunity from incendiary disaster.

The ordinary dwelling-houses of the metropolis call for the concrete-maker even more desperately than the sham fireproof building which they often surround. The soil on which they rest is fœtid—permeated with new drains or old cesspools. The speculators—and every one connected with houses and land in London comes under that title—cause this fœtid earth to be dug into to a certain depth. Brick piers are then planted at intervals, and wood beams are laid upon them; and, crosswise, upon the latter are fixed deal boards, so jointed that often between the lowest rooms of the house and the soil there is only a void of a few feet, sometimes even inches. In the centre of Paris it would be difficult to find any basements inhabited during the day (never occupied at night) which approach in this dangerous respect the lowest stories of many first-class London residences. Where a house in new Paris does not rest upon vaulted cellars, a certain thickness of *béton*—composed of pebbles, sand, and hydraulic lime—generally covers the whole surface of the soil. Upon this *béton* there is sometimes a covering of bitumen; and sometimes floor-boards are bedded in the bitumen itself. To prolong a comparison between the freehold houses of Paris and the leasehold houses of London is to repeat what has been over and over again condemned in our pages. In none of the great cities of Europe, except perhaps those of Holland, are floor joists and boards such as are daily constructed in London, to be found. The joists, 8 in. or 9 in. deep by 2 in. thick, are covered at top with rough boards gaping at the joints, and at bottom with strips of wood embedded in a coarse mixture of inflammable mortar. The inner space between the coat of ceiling and the covering of planks is hollow—a place where gas-pipes are laid insidiously, half concealed. In central London, in the increasing number of new houses, which are let as offices and even residential chambers, such is the kind of flooring forming the horizontal party-wall between distinct tenements. Neighbours ignorant of each other's faces, but not of each other's existence, participate in every sound; and the slightest motion on the part of either is communicated through a combination of carpentry disregarded by the Metropolitan Building Act, on the insular plea that the house, being inclosed between vertical party-walls, must necessarily be occupied by a single family or group of persons prepared to share in common the risks of habitation. Each floor-structure resembles the other; and the ignition by fire of one implies with logical certainty the destruction of that above it. Many of the partitions and the roof consist of inflammable posts and rafters, thin laths, and coverings of lime and hair, under and behind which are hollow spaces. No part of Western Europe contains so complicated and extensive an area of loose building as the centre of the English metropolis offers to the concrete enthusiast.

Vacant building land is now happily to be seen in several parts of the town. The construction of the Victoria-Embankment has necessarily led to the formation of new approaches to it. One of the conditions imposed upon the purchasers of land bordering Northumberland Avenue is that the fronts of all the new houses shall be built of granite, marble, or stone; and, according to the provisions of the Act of Parliament under which the new street was made, the designs of these fronts must first be approved by the Royal Institute of British Architects. It must not, however, be supposed that such a specification of materials for the one external street wall, and such artistic precautions, ensure equally good or substantial internal construction. There is nothing in the clauses of the Metropolitan Building Act to prevent the several horizontal divisions of a dwelling-house behind these solid fronts from being constructed with naked fir and deal; yet it may be taken as certain that no new house in Northumberland Avenue will be exclusively occupied by a single family or group of persons living in common. On the contrary, it will be let by floors, or even rooms; and, provided it has been arranged on the old-fashioned London system, enormous pains will be taken in constructing the two vertical party-walls inclosing it on each side; but the horizontal divisions between six or seven stories of distinct tenements superposed will consist of the flimsiest wood. Surely, the innovator who can show British architects how to make horizontal party-walls, even as imperfect as those to which the Parisians are thoroughly accustomed, will earn at least the right of never again being compared with a "projector" of Lagado.

THE LOAN EXHIBITION OF SCIENTIFIC APPARATUS, SOUTH KENSINGTON.

THE long galleries on the west side of the Horticultural Gardens, which held, not long since, the successive international collections of generally mediocre sculpture and painting, and of art-work of various kinds, good and bad, are now occupied by a collection of objects of entirely different nature and interest. The south and west galleries on the ground floor, and part of the west galleries on the first floor, are filled with a collection of contrivances, perplexing in their number and variety, all designed either to shorten and relieve human labour, or to advance human knowledge, by assisting the hand, eye, and brain in investigation, and in stating the results of investigation. Under these heads it is possible to generalise everything which could be included in such a collection. The difficulty in rendering these things really interesting to visitors is that, especially to those little acquainted with the use of such apparatus, the value and the peculiar *modus operandi* of the apparatus exhibited are scarcely rendered evident except by

seeing them in use. The mere spectacle of a set of instruments ranged on a table tells little to the unitiated eye. The promoters of the exhibition have done their very best to remedy this drawback, by providing not only a very full and tolerably well classified catalogue, but a Hand-book containing essays by men of eminence in their respective departments, giving something of the outlines and present position of the branch of scientific research which each class of apparatus is designed to aid, and the principles upon which the apparatus is designed. These essays are very well calculated to teach people to think on the subjects treated of, and to give that amount of general information which is all that the section of the public not engaged in scientific pursuits can for the most part hope to acquire; and perhaps this handbook will be the part of the scheme which is most likely to have the educational influence which we presume is intended. In other ways, we very much doubt the exhibition exercising such an influence. The different classes of apparatus are not arranged in any such consecutive manner as to afford, what might in some cases at least have been afforded, an illustration of the progressive development of special methods of investigation, and of the progressive improvement of the instruments employed. Old instruments and new, instruments on different and varying principles, seem scattered about without much plan, and what appears to be a systematic classification in the catalogue has not its counterpart in the arrangement. There is difficulty also in finding the numbers referred to in the catalogue, owing to the partial irregularity in the placing of the articles, or even finding in which case an article described is to be seen. Few, we imagine, will take take the trouble to hunt up things under these circumstances, and our impression is that the exhibition will not much attract those for whose edification it is intended, and that the bulk of visitors to it will consist of those who already possess special scientific knowledge, not those who come to acquire it, and who would find difficulty in gaining their object if they did, for the reasons just mentioned. A lecture on a scientific apparatus, with the objects treated of present and in working order, and exhibited by a proficient who can handle them so as to exemplify their special achievements, has always an interest for a general audience, though it may be surmised that many in such a case do not learn as much as they imagine. But it is difficult to interest a popular concourse in a mere range of dead instruments, as one may call them. The Hand-book, however, is of real value, and we recommend all who wish to derive any real information from the exhibition to purchase it and digest some of its contents before making any attempt at more particular examination of the objects to be seen.

We can only here indicate generally the nature and extent of the subjects illustrated in this large collection. It is to be understood that although efforts have been made to obtain a representation of scientific apparatus and improvements from every source independently of country, there is no intention of giving to this exhibition anything like an "international" character in the sense in which the word has usually been understood in reference to exhibitions. It is not, that is to say, an occasion for one country to exhibit its special excellences in rivalry with another; the principle is merely that the best modern invention or improvement in any branch of scientific apparatus, from whatever part of the world, was to be illustrated; and to some extent at least this has been accomplished. The great result probably will be that specialists of the various countries will see where they are behind others, and can make improvements. Returning to the immediate subject of remark, we may observe that the apparatus exhibited are classed under the following sections:—

1. Arithmetic.
2. Geometry.
3. Measurement.
4. Kinematics, Statics, and Dynamics.
5. Molecular Physics.
6. Sound.
7. Light.
8. Heat.
9. Magnetism.
10. Electricity.
11. Astronomy.
12. Applied Mechanics.
13. Chemistry.
14. Meteorology.
15. Geography.
16. Geology and Mining.
17. Mineralogy, Crystallography.
18. Biology.
19. Educational Appliances.
20. Photographs, &c., illustrating Italian Science.
21. Miscellaneous.

Under the last rather vague term come some few things (books, plans of foreign laboratories, &c.), which could not well be included under any of the other classes. "Educational Appliances" includes whatever is intended simply for purposes of demonstration, and a rather curious list it makes in the catalogue, more extensive and various than would be supposed. Atlases, geometrical figures, and appliances for demonstrating various facts in the laws of force and motion, &c., are, of course, what one would expect to find under this head; but it is hard to see how two stuffed birds (No. 4,152 in catalogue) are to be classed as "educational appliances"; the article next in order, "Model of the Digestive Organs of a Goose," may have a personal interest for some other stuffed bipeds, in the height of the dining-out season, no doubt.

Mr. Clerk Maxwell's general article on scientific apparatus, which is prefixed as a kind of introductory chapter to the handbook, is a very able *resumé* of the objects to be attained by such apparatus, and the end to be kept in view in their construction. The importance of the mere putting together of instruments for delicate operations, the care that has to be exercised to avoid unequal strains, is a point which probably few who have not habitually to do with such instruments, or have not acquired the habit of reflecting on the mechanical conditions of construction, in the least appreciate. Any one can understand, for instance, that the grinding of the metal reflector for a large reflecting telescope is a matter requiring great care and nicety, so as to ensure not only a perfectly polished surface, but one perfectly true and uniform in plane and angle, the slightest inaccuracy resulting in a distorted image. But it would perhaps occur to few not professedly scientific people, that when this true surface was obtained, an almost equally delicate operation remained in providing for the fixing of the reflector so that it should have always a uniform bearing which ever way the telescope was turned, without which precaution it would distort itself, after fixing, by its own weight. Yet this was one of the greatest difficulties experienced on the first making of very large reflecting telescopes, and the means of adequately meeting it engaged the attention and invention both of eminent makers and eminent astronomers. It is this kind of difficulty which is stated in general terms by Mr. Maxwell. "The fundamental principle is, that the construction of the instrument should be adapted to the use that is to be made of it, and in particular that the parts intended to be fixed should not be liable to become displaced; that the parts which ought to be movable should not be liable to stick fast; that parts which have to be observed should not be covered up and kept in the dark; and that pieces intended to have a definite form should not be disfigured by warping, straining, or wearing." And therefore it is necessary, in putting an instrument together, to consider carefully the strains and stresses which will be brought to bear on each part. And in regard to this a guiding axiom to be kept in mind is that "a rigid body has six degrees of freedom." The materials of which instruments are formed are not absolutely rigid. "Hence, if a solid piece is constrained in more than six ways, it will be subject to internal stress, and will become strained or distorted, and this in a manner which, without the most exact microscopical measurements, it would be impossible to specify." Upon due provision against such distortion depends much of the accuracy and value of many observations; an accuracy which is, however, never complete, unless by accident, as it is now a recognised fact that accuracy, in the mathematical sense of the word, is impossible, and the results from the best and most carefully-made instruments have to be corrected for known errors, such correction being a systematised part of scientific observation. Some of the various principles which have been employed to reduce these inevitable inaccuracies to a minimum are briefly touched upon in Mr. Maxwell's essay, and this subject alone would form a most suggestive basis upon which to examine the special merits of some of the numerous appliances exhibited here, with the view of judging (so far as a minute inspection is possible) how far and how nearly they really perform that which it is their object to perform.

Among curiosities of the exhibition we may mention that the "Rocket" locomotive and Newton's little reflecting telescope are among the objects to be seen; two, perhaps, of the most interesting specimens of work in existence, in regard to their history and associations.

A COLLECTION OF ORIENTAL WORK.

MESSRS. JACKSON & GRAHAM, the well-known furnishers and decorators, of Oxford-street, have just added to their establishment a special department for the display and sale of works chiefly of Japanese ornamental art, including also Chinese and other work; by far the larger portion, however, being Japanese. The collection includes some of the finest specimens of lacquer work we have ever seen, chiefly applied to writing-cases and such articles. In addition to lacquer-work and *cloisonné* enamel, and other among the now well-known branches of Japanese art-work, are some curious and (in this country) almost unique examples of some kinds of manufacture not practised at present in Japan, and of which there are few specimens to be found. The collection, for which Messrs. Jackson & Graham have employed special agents for a year past, has been made with the view of representing, so far as possible, every style of Japanese art, and it is well worth the attention of those who wish to pick up what is unquestionably rare and genuine, as well as beautiful, in this remarkable class of work, the merit of which, within certain limits, can hardly be exaggerated.

The peculiar and wayward fancy of the Japanese art-workman is well illustrated in many things in the collection; in the little water-bottles, for mixing the Indian ink, for instance, which form part of the writing-case fittings; these take all kinds of fanciful and unexpected forms; and so with other articles of practical use. This kind of treatment would partake of affectation if employed in English work; in Japanese work it is always pleasing, because the offspring of a genuine and native humour.

Among the leading items in the collection are two elephants cut in dark grey jade, with tusks of white jade, and mounted on enamelled stands, which formed part of the ornaments of the Summer Palace of Pekin, of the destruction of which so much has been said.

THE GLACIARIUM; WOOD-WORKING MACHINERY.

SOCIETY OF ENGINEERS.

ON Monday last, the members of this Society had an interesting out-door tour in Chelsea, where they visited the Glaciarium, or skating-rink of real ice, that has been opened experimentally by Mr. Gamgee, of refrigeratory fame. The rink is in area rather limited, and the evolutionists upon the ice are hence circumscribed and hindered in the graceful display they might otherwise make. The walls are lofty, and divided into four bays on the sides and three on the ends, the lower parts of which are adorned with views of Alpine, glacial, or frozen regions, real or imaginary. The rink has an open-timber roof, and has its natural and artificial light from a height somewhat above the wall-heads. There is a gallery at each end for spectators, and no visitor is allowed on any pretext to pass upon the ice unless properly shod, i.e., with skates. Mr. Gamgee gave an interesting explanation of the manner in which the ice is prepared, and a description of the machinery in use for the purpose, which, when changed from the ether process, for which it had been designed, and adapted to the use of sulphurous acid, SO2, would, he felt sure, revolutionise the art and practice of refrigeration. The visitors, unusually numerous, appeared much pleased and interested.

The visitors next proceeded to the extensive, recently remodelled and enlarged, wood-working machinery factory of Messrs. A. Ransome & Co., where they were received by the heads of the firm and their manager. The progress through the works followed pretty closely the process of manufacture, commencing with the partners' rooms and the general offices, in which orders are first received and finally dealt with, passing from the drawing-office to the pattern-shop, and thence to the smiths' shop, turnery, and the large fitting-shop, plentifully supplied with modern machine tools of the best descriptions.

The inspection terminated, and the interest of the visitors culminated, in the large "trial-shop," in which a variety of completed machines, waiting delivery to those by whom they had been ordered, were also ready for being shown in operation. The trial-shop has its own engine, with steam kept up, so that any of the machines in it may be put in motion at pleasure. Several machines were in succession shown at work, those exciting most interest being the novelties for cask-making. One series of machines saw and joint the staves; joint, dowel, and turn the ends; set up, truss, and groove the staves; and another was also being designed for making the wooden hoops. The machines perform their work very clean, and with great rapidity. The length of time spent at the Stanley works prevented the visitors from doing more than scant justice to the Oakley works of Messrs. S. W. Worssam & Co., next visited, where also some very effective wood-working machines were shown. The members and their friends brought the pleasant and interesting proceedings of the afternoon to a close by dining together in the Cannon-street Terminus Hotel. Mr. Nursey, the secretary, did duty efficiently as conductor.

GUILDHALL LIBRARY.

AN interesting, and, indeed, important experiment is about to be tried in the Library of the Guildhall, London. In December last, petitions from warehousemen and householders, carrying on business within the City of London, and their *employés* and others, praying the Court to extend to them the advantages and benefits of the Guildhall Library, by throwing it open every evening during the week, were referred to the Library Committee. On the 23rd of March the committee brought up a report recommending that, as an experiment, the library should be opened to the public for twelve months, on every evening during the week, except Saturday, until nine p.m., and closed on Saturday at two p.m. Also submitting sundry recommendations as to additional staff required and other expenses to be incurred consequent thereon, at a cost not exceeding 1,060*l.*, exclusive of gas and warming, the cost of which would be about 500*l.* more. This report passed the Court of Common Council intact, and the time fixed for the evening opening is now definitely settled for Midsummer day, the 24th proximo. It is to be hoped that the experiment will prove a sufficient success to warrant the continuance for a permanence of the heavy additional expense which the opening in the evening necessarily occasions.

The late chairman of the Library Committee, Mr. John Symonds, forwarded this matter very warmly, and at a dinner given not long ago, under the presidency of Mr. Reginald Hanson, F.S.A., the present chairman of the committee, a testimonial was presented to Mr. Symonds, consisting of a drawing-room clock and a pair of vases, in recognition of their esteem and regard, and their high appreciation of the value of his services during last year.

BUILDERS' BENEVOLENT INSTITUTION.

THE forty-fifth election of pensioners on the funds of this Institution was held on Thursday last, at Willis's Rooms, St. James's, Mr. George Plucknett (treasurer), in the chair, in the unavoidable absence of Mr. John Aird, jun., President. There were vacancies for three pensioners,—two men and one woman. The male candidates were:—Evan Jones, aged 67, plasterer (fifth application); William Stribling, 74, carpenter and builder (fourth application); and Henry Atkins, 72, builder (second application). The female applicants were Harriet Thorpe, aged 60, widow of an eleven years' subscriber to the Institution; Eleanor Winter, 60, widow of Charles Winter, builder; and Susannah Webb, 60, widow of Thomas Webb, builder,—all being candidates for the first time. Messrs. Thomas Stirling and Matthew Hall acted as scrutineers, and at the close of the poll reported that the successful candidates were William Stribling, 4,127 votes; Evan Jones, 3,141; and Mrs. Thorpe, 1,335. Votes of thanks to the chairman and the scrutineers brought the proceedings to a close. We may note that a courteous secretary to the Institution has been found in the person of Major Brutton, who, as announced in our report of the annual dinner in November last, has been appointed in the room of the late Mr. A. G. Harris.

BUILDING FOR THE PARIS INTERNATIONAL EXHIBITION, 1878.

THE commissioners appointed to examine the various projects (ninety-four in number) have selected twelve, each of the authors of which will receive, for the first six 3,000 francs, the three following 2,000 francs, and the remaining three 1,000 francs. A select committee will meet in a few days to ratify the choice of the above, and appoint an architect to carry out the construction, and he will select from the designs chosen the most salient points calculated to give beauty and commodity to the building. From our personal inspection of the designs, we should think it not unlikely that the architect will borrow largely from those exhibited by Messrs. DAVIOUD & BOURDAIS, on account of their simplicity and lightness.

MASTERS AND MEN.

Cardiff.—A strike of painters took place on Monday last, the 22nd inst., at Cardiff, owing to demands which the masters refused to concede.

Bristol.—The strike and lock-out amongst the house-painters and decorators of Bristol still continues. Out of the 700 men who have been locked out, about 250 men have obtained work in other towns, whilst small bodies of the non-society men have formed co-operative companies, and are obtaining work from private sources. The men are determined not to resume work unless their demands of one penny per hour are conceded.

Bradford.—The strike of night-soil men in Bradford has had a speedy termination. The situations vacant by the strike of the twenty or thirty "throwers out" were all filled up on the 17th inst., and several applicants had to be turned away. All the "throwers out" are now working according to the new scale of 1s. 6d. per ashpit.

Swansea.—The practical result of the late strike of operative masons in Swansea, for an advance of 6d. per day wages, has been the formation of a masters' association for the whole of South Wales and Monmouthshire. At a general meeting of employers it was unanimously resolved to establish "a properly constituted association, having for its object a desire to protect themselves against unreasonable demands, especially when times are, as at present, in such a prostrate condition, and which, by co-operation, may be averted; to protect themselves against all impositions; and for the welfare and furtherance of trade in general."

Hafodywern, near Carnarvon.—A serious disturbance has taken place at the Hafodywern Slate Quarry, Bettws, Garmon, some five miles from Carnarvon. The manager, it appears, had adopted an exceptional rule by paying the men by the hour, the general custom at other quarries being, in the case of quarrymen, payment by the bargain or piece, and for labourers, by the ton. The men refused to work upon such terms, and a number of Cornishmen and strangers, fifty-four altogether, were imported to replace them. On the 12th inst., during the absence of Mr. Wilson, the chief manager, four men waited upon Mr. Lane, the agent, and, representing themselves as a deputation from some 500 men, who were standing on the hill above the quarry, complained of the mode of payment. Mr. Lane replied that the system was practically in accordance with that in force at other quarries; but, whilst the point was being discussed, the men on the hill went to the upper working of the quarry, and drove the Cornishmen from the level. Several of the Cornishmen were hurt by the stones and other missiles which were freely used; Mr. Lane and his son were badly kicked; and Mr. Andrew Bealth, engineer of the quarry, and one of the shareholders, after being knocked down with a stone and brutally kicked, was dragged some distance on a wagon, and pitched out on a heap of iron pipes. Mr. Bealth is confined to his bed, and it is feared that he has sustained severe internal injuries.

Leicester.—The strike of Leicester painters which has continued for five weeks, has been brought to a termination. The men came out for an advance from 6¾d. to 8d. per hour, which was resisted by the masters, who offered 7d., or an advance, at the same rate as at Birmingham, of ¼d. per hour, which alike met with a refusal on the part of the men. The matter was referred to arbitration, the arbitrator being Alderman William Winterton, J.P., who on Saturday gave in his award of 7¼d., or an advance of ½d. per hour. This has been unanimously approved by the association, and the men have resumed work.

Mexborough.—For a week or two the masons of Mexborough have been on strike for an advance of 1d. per hour. The masters stoutly resisted this, but as there are many new buildings in course of erection at Mexborough and Swinton, a compromise has been effected. The men have agreed to resume work at ½d. per hour advance.

Oxford.—In consequence of the advance of 1d. per hour not having been conceded by the whole of the masters, some of the carpenters of the city are on strike.

Carnarvon.—The annual conference of the North Wales quarrymen was held at Carnarvon on the 20th inst., Mr. John Lloyd Jones presiding. The report stated that the number of members was 7,460, and the funds in hand 3,094*l.*, an increase of nearly 2,000*l.* The increase in the wages paid at the several slate quarries in North Wales for the year was stated to be upwards of 150,000*l.* Papers on subjects connected with colliery life were read, and the proceedings closed with a public meeting, at which Mr. Morgan Lloyd, M.P., was the chief speaker.

Willenhall.—An important change has just been initiated in the lock trade at Willenhall. The lockmakers have by a large majority resolved to abolish the system of "hiring" which has for a very long period prevailed in the trade. By this system a workman engages himself to an employer for a term of years, in consideration of a loan of money—ranging from 5*l.* to 20*l.*—to be repaid by weekly instalments. It is stated that owing to the scarcity of skilled workpeople, employers have lately been outbidding each other in the offer of loans, and not only has the trade become disorganised, but the social effects of the system upon the workpeople themselves and their wives and families have been unsatisfactory. Mr. Isaac Spooner, the stipendiary magistrate for South Staffordshire, has repeatedly condemned the system as being little short of "white slavery."

Macclesfield.—A meeting of the master painters of Macclesfield was held on the 15th inst., to take into consideration the application of the operatives for an advance of wages. After considering the application it was unanimously resolved not to advance upon the offer already made of 6¾d. per hour, which places the men in as good a relative position as they have ever occupied towards Manchester and the surrounding towns, their present offer being 60 per cent. more for ordinary hands and nearly 100 per cent. for extra skilled labour than was paid thirty years ago. It was further resolved that the shops remain open until Tuesday morning, the 23rd inst., for the men to return to work, when if those terms were not accepted, the employers would advertise and adopt every lawful means to fill their places.

London.—The Council of the London Builders' Labourers' Amalgamated Union issued, on the 17th inst., an address to the officers and members of the builders', contractors', and general labourers' societies throughout the United Kingdom, in which they draw attention to the fact that,—

"The master builders and contractors throughout the country have allied themselves to the National Federated Association of Employers of Labour, which enables them at any time to take advantage of our present disorganised and helpless condition, isolated as our societies are in various towns and districts."

The Council then say,—

"With a view of remedying this deplorable state of isolation, and to consolidate and strengthen our position in the future, we have received urgent applications from provincial towns on the subject of federations which have induced the Union of London to instruct their general secretary (Mr. P. Kenny) to issue an appeal to the societies to send representatives to a congress of delegates, to be held on Monday, August 7th, for the purpose of discussing and arranging the plan of a national federation."

Douglas (Isle of Man).—The Douglas (Isle of Man) masons have struck work for an advance of 4s. (to 28s.) a week, the masters having only granted 27s. The joiners lately obtained 27s.

The Cathedral Dispute in Bristol.—Canons Norris and Wade, who objected to the resolution of the Dean and Chapter directing the peremptory removal of the statuary of the north porch, have resolved to appeal to the Visitor, who is the Bishop of the diocese, to hold a visitation under an old statute, and hear arguments of counsel on either side with regard to the legality of the removal of the figures. Counsel has been retained, and proctors are actively engaged in getting up the case.

IN AMERICA FOR THE FIRST TIME.

IT is worth going away for a long journey, as it makes you so keenly alive to the great kindness of your friends which your proposed undertaking invokes, and the good wishes on their part that it inspires. Fortified with this feeling I made my way to Liverpool the day before the steamer started. At the hotel there I could not help remarking the change in manners and customs that has been produced in a comparatively few years. At the next table was a party dining, who partook of light red wine and Perrier-Jouet champagne. Before the days of free trade they would have been drinking of brandied sherry and black port; but then it was thought right to impose heavy duties on French wine because we fought that nation, and to give privileges to Spain and Portugal, who took our money from us, which they never repaid. Every young man who now takes his pint of "fiz" would have been thought an enemy to his country, and on the high-road to ruin, though for all that he may be "ganging the same gate," if his means are not proportionate to his tastes. On board I soon found the difference between personal assertion and personal experience. Many Americans have told me that they would rather cross the Atlantic twice than the British Channel once. I have never been on the Zuyder Zee, but if that ever rolled like the Atlantic, then the immortal Van Dunk was perfectly justified in refusing to take water only in the quantity suggested by the lines that have been so beautifully harmonised by our national composer,—

> "That a rose supplies
> When a dew-drop lies
> On its leaf in a summer morning."

After the rolling, pitching, befogging that I experienced, and even though I am assured it was a good passage, I will never hear the "little white streak" depreciated without a strong protest. It is only just, however, to acknowledge the thoughtful care that is taken on the Atlantic steamers to ensure the comfort and safety of the passengers. Another experience of the same sort was the assertion of a lady, who has just published a book upon America, that an American always carries a revolver in a pocket made for the purpose in his trousers. If this playful custom exists, I have not yet discovered it, thus far.

On the voyage, the great object of interest outside the ordinary amusements was the exhibition and explanation of the "radiometer," the instrument illustrating the discovery of Professor Crookes, that light has a motive power. It was shown by Mr. Hicks, of Hatton-garden, who was proceeding to Philadelphia to have it placed in his case of mathematical and scientific instruments, for which he has patents, and which will form one of the most interesting collections at the "Centennial."

But there is always a yearning for the undiscovered that may yet satisfy men's needs. "Could you not," said one of the officers, who had been distinguished for great pluck on more than one occasion, "invent a light that could be seen in a fog?" This is a query I repeat to the readers of the *Builder*. Can any one supply the one need that would remove the only anxiety that a sailor seems to feel in making this voyage?

The first impression of New York was most favourable. I spoke to the Custom-house officer who came on board, and told him that it was my first visit. He replied, "Well, when you are on shore, you shall have as little trouble as possible, and we will start you pleasantly." And then I crossed by the ferry to the Island of Manhattan: so called, from the abbreviated name given to it by the Indians, as I found by a local history in the room of the hotel. When Henry Hudson, on the 3rd of September, 1609, entered the river to which his name is given, he made a bargain with the Indians for land, and the negotiations were lubricated by a plentiful supply of "fire water," and the natives ever afterwards called it "*Mana hactanienks*,"—the place where they all got drunk.

Every stranger, on visiting New York, must have a strong opinion that it is the worst-paved city in the universe. This opinion will be modified on visiting Philadelphia. There are two sides to every question. On asking one of "Young America" (the representatives of which are very much like those of "Young England" both in dress, manners, and tastes) why he and his friends did not start some Hansom cabs, he replied that they had done so, but the bad pavement had crippled the horses and disabled the cabs. I then made inquiries about the paving, and found that it was as great a problem as the drainage of great towns with us; that he who could solve it would be not only a great benefactor to his species, but also attain the "mighty dollar." The extremes of temperature that New York experiences render any permanent roadway quite an impossibility. They have tried stone, wood, and asphalte: they all seem to share the same fate, and leave the streets in a series of furrows, over which it is torture to be conveyed. The only resource is the street-cars, which, running on a tramway, give an easy and pleasant conveyance; but as these are not limited to carry a certain number, they are crowded beyond endurance; and I have over and over again been astonished to see numbers of fashionably-dressed ladies jammed in with reeking niggers and fusty mechanics and labourers. Here, at Philadelphia, they have started a number of comfortable wagonettes, to convey visitors to the Exhibition. I tried one, and soon found the origin and necessity of the American expression, "Hold on." "Over the stones it rattled my bones," and I felt so dislocated that I was inclined to ask the men who were putting up a plaster cast of some extinct animal, whether they would kindly go over my limbs, and see which were out of place. If I come back whole, it must be due to no other cause than the strength of the ligatures with which Nature has blessed me. Here, then, is a future for some coming McAdam, to make a road that will endure in spite of zero in winter and 100° in the shade in summer. As to how the multitude will get to the building to-morrow I am puzzled, as it is raining in torrents, and I am afraid the "cobbles" will be looser than ever. Having seen a great many interiors in New York, I can confirm what was lately stated in the *Builder* with regard to the comfort, convenience, and elegance of the private houses; the only exception that I could take would be to the warming apparatus, which too frequently gives the owners a facility of making the house much too warm, and creating a danger when one has to face the hard dry cold without. The picture-galleries which are attached to some of the houses are specimens of what ingenuity and taste can do to make a temple for the owner's household gods. I have seen the choice collections of Mr. John Taylor Johnstone, Mr. Belmont, and Mr. Marshall O. Roberts. The clubs of New York are the perfection of management, and the privilege the members have of putting down the name of a visitor during his short stay far exceeds anything of which our hospitality can boast in London.

I visited the Law Courts, and heard one of the numerous cases of which we can show a good return, the malversation of directors. The principal director and delinquent was the very counterpart of a gentleman that I had heard tried before I left England. His brown wig, his coolness, and his "cheek," all proved that Nature frequently casts her knaves in the same mould.

I also went to the Egyptian building, on approaching which I knew, by the ragged, crying women, that I was near a police-court. This is the Tombs,—a court and a place of detention. Two magistrates were sitting in petty sessions. Those who appeared for the prisoner were of the same stamp as may be seen in England; but that most unlike our proceeding was calling the prisoner to the stand, administering an oath, and taking his version of the affair. I afterwards visited the cells with a warder, who seemed the personification of benevolence and mild speaking. Without any morbid sentiment about prison discipline, I cannot assent to the propriety of placing two, three, or even four persons to share the same cell and the same bed. There were two burglars, who had been convicted and sentenced, one to ten, the other to four, years' imprisonment, both in the same cell, which was, doubtless, most agreeable, thus enabling them to review their past and prepare for their future. But what is to be said of punishment or reformation? Perhaps reformation for crime has to be classed with smaller domestic vices, which may be illustrated by the reply a lady made to me when we were speaking of a young lady whose parents objected to her marrying a man who was given to intemperance. "No doubt," I said, "she thinks she will be able to reform him." "No man can be reformed who has one thousand dollars a day," was the answer.

The Masonic Hall is a building of great importance. A stranger in the land, I "worked in" to the Copestone Lodge, No. 641, and very rigid the work was. After I had passed the portals I was most cordially received. There are eight lodge-rooms in the building, and they are all occupied every night in the week, and as there are no banquets or suppers, this constant attention to work must arise from pure love and enthusiasm for the craft. Yesterday morning I started for the opening of the Centennial. I managed to secure a place in a wagonette, which was a great piece of good fortune, seeing that the street-cars were loaded or packed with a freight of fifty or sixty.

Besides the invited guests, every citizen was admitted who could pay 50 cents in one bill. The number admitted it is very difficult to estimate. One paper this morning says that some defect in the turnstiles makes the number an estimate only, and then goes on to say that there must have been from 150,000 to 250,000, a tolerable margin. I had a favoured place on the platform not far from the president, and as the mass congregated there to hear the speeches and the music, and though the citizens were densely packed, I should say the smaller estimate far exceeded the number present. When a march by Wagner had ceased, Bishop Simpson made a long prayer amidst many cries of "Down with umbrellas!" which had been opened in consequence of the intense heat of the sun's rays. Not a single awning having been erected, the poor conductor of the concert was obliged to put on his hat for protection. The impatience during the prayer was shown by a gentleman next to me, who exclaimed: "Well, if every one is going to *spread himself* in this way we shan't get done to-day."

He finished, and there was more music, the vocal part of which was very good. Mr. Whitney, of Boston, obtained a well-deserved encore for a bass solo in the cantata. Before the president spoke the citizens who had been swaying to and fro only restrained by a rope and a few policemen, broke down the barrier, and the confusion was intense. The platform on which I was had to be cleared in order to prepare an avenue down which the procession was to pass, and I with hundreds of others sought refuge in the fine-art department of the memorial building. I went into the English division, and I was immediately at home with many old familiar friends. The pictures are well hung, and have a very good light. I walked round to see which pictures attracted the most attention. The greatest crowds by far were in front of "The Marriage of the Prince of Wales," by Frith, lent by her Majesty. Next to this, I should say "The Casual Ward," by S. L. Fildes, lent by Mr. T. Taylor, attracted the greatest attention. Very many were looking at Frith's "Railway Station," but railway stations in America are so different from those in England, that the gazers did not seem to understand it; just as they passed by as a thing most incomprehensible "The Three Jolly Postboys,"—a genus not known on this side of the Atlantic. There were small and quiet admiring groups about the other gems accordingly as they appealed to the sentiments. "Early Days," by Millais, lent by Mr. C. P. Matthews, inspiring bright hopes, or in the contrast of depressing sorrow in the picture of "The Village Funeral," by Holl, lent by Mr. J. Akroyd. There was one which I had not seen before, "The Five Sisters of York," by Mrs. Louise Jopling, a picture of rare merit. The sister with the blue eyes and the golden hair shows that the artist has studied Millais with great effect. The owners who have thus "loaned" their household gods deserve a large tribute of gratitude for the risks they have run; but it will be gratifying to them to hear that in the transit not a glass was broken, nor the slightest portion even of a frame injured.

After this I went into the grounds, which I found in the most terrible disorder,—grass all trampled out of existence, paths which had been saturated with the previous day's rain converted into quagmires, with thousands of "footprints" to record the celebration.

The President had proceeded through the building, and declared the Exhibition open. The majestic driving-engine, erected by Mr. Geo. H. Corliss, of Providence, U.S., was doing its work, but there was very little ready to be driven. The Walter Press, of the *Times*, was, of course, one of the first to start, and attracted an immense assemblage of spectators. In the afternoon the rain fell very heavily, and the grounds, which before were bad, became terrible in clay sloppiness. There was no cessation of the rain, and I was compelled to walk, seeing hundreds, nay thousands, of poor draggled women taking shelter, waiting for a chance of getting a place

in a "street car"; and thus ended the opening of what was little opened. It will take a long time to complete the Exhibition, and then perhaps there will not be much to show, as many exhibitors expressed to me their dread that their products would all be destroyed by the manipulation which the Americans seem to claim as their right. F. S. A.

THE WORKS AT THE BRITISH MUSEUM.

The great institution at Bloomsbury is, in many respects, so valuable that the nation never grudges any expenditure really required for its enlargement and enrichment. The latter process cannot, of course, go on under the existing system without the former; but there are two sets of opinion to consult. There are those who regard the Museum as a place for popular show, and for the amusement of Easter, Whitsuntide, and Christmas holiday-makers. These have, by a variety of arguments, advocated the retention of all the collections, zoological and others, included under the head of Natural History, which, without being ornamental, are undoubtedly instructive and curious. There are others, however, who insist, with equal emphasis, upon the removal of these departments to South Kensington, where, indeed, an addition to the ever-expanding group of structures is already being prepared for their reception. That the transfer will take place by degrees is possible, since the space now marked out could not accommodate that vast array of stuffed animals and crowded cases in which so much of science is illustrated, for the eye of the multitude, in the heart and centre of London. But it has, to all appearance, been resolved upon, though we may not have heard the last of the Parliamentary discussion on the subject. There is certainly force in the objection that these cabinets, upon which Cockneys and country cousins so love to gaze, will, for the future, be placed at a distance inconvenient to many; but day by day the tendency increases to seek for pleasure beyond the denser thoroughfares of the metropolis. If the change, moreover, be an objectionable one, the choice simply lies between it, and allowing treasures of priceless worth and incomparable beauty to moulder invisibly in the sheds or cellarage of a building no longer capacious enough for their display. The whole multifarious dead menagerie must, then, be swept away in order that the edifice may become a kind of British Vatican, in a special sense, of Art and Archæology. In this case, there can be no appeal to the intentions of the founder. His original suggestions have, over and over again, been swamped, his plan improved out of sight; and the question is now a purely national one, though to judge from the acts of the trustees, from time to time, it would seem as if they regarded the Museum as a sort of corporate property, if not a private estate, privileged with large allowances by the House of Commons, but with the control over which the public have nothing to do. Extensive alterations are now going on which, in many respects, appear likely to be improvements, in that Temple of all the Styles, from its roof almost to its foundations, and what their ultimate cost may be it is impossible to tell. Already, the first calculations have been out-grown in a proportion of nearly two-thirds, and it is certain that the estimate of last year will be altogether inadequate to carry out the architect's designs. In fact, it is not yet absolutely settled at what point the dilapidations and restorations stop, since there are frequent consultations of the trustees, and the vote of last session was, practically, only one on account. The official statements are exceedingly vague, but these are purposely so, because an obvious,—indeed, an avowed,—disinclination exists that the matter should be canvassed at all outside of the Bloomsbury gates. It is impossible, for example, to elicit a word concerning the Natural History collections, but their disposal was a foregone conclusion, long ago. If, however, the trustees are exercising a legitimate power, we are far from denying that they are exercising it in an apparently judicious manner. The quadrupeds, birds, insects, and reptiles, in the course of a few years, would fill the place to bursting, and even now an immense wealth lies hidden, if not decaying. But the new scheme cannot be expected to receive its full development in less than at least a year,—that is, if all the expansions contemplated, though not laid down on the actual plans, are to be carried out. So far, a considerable proportion of the underground labyrinth, involving very essential arrangements, has been temporarily demolished, and huge timber frameworks and palisadings occupy its place, the reasons alleged being the number of complaints, and certain sanitary obstacles to be overcome. Instead of the present approach to the reading-room, the finest in Europe, though possessing too much of an ephemeral character, and not belonging to the original design, a lobby of half the length is to be substituted, entered through a new Antiquity hall, to be fitted up for the reception, it was hoped, of some, at any rate, of those marbles which have so long been mouldering in those pent-houses of pitch-and-pine, that contain an unknown opulence of unique treasures. It would be a satisfaction to see them decently sheltered and systematically exhibited, anyhow. Yet the most cursory investigation shows that these neglected riches are not to be taken in, and the ground for their exclusion is that they are in course of restoration or repair. Then why create a workshop, in the shape of a scarcely-waterproof series of black sheds, against one of the few modern façades of any magnificence in the metropolis? Surely, the work might be conducted elsewhere, leaving the grand columnar portico free from an excrescence that threatens to be permanent. To continue, however, with reference to the improvements. That in the basement, to be rather incongruously mixed up with lavatories and their appendages, is designed for relics of architecture and sculpture,—unless, indeed, some fresh inspiration seizes the trustees; but very many of these are, as yet, unpacked, so that the abandoned accumulations of the last few years, which we saw the other day in a state of indescribable chaos in the shanties outside the building, will be left in that condition still, except when some unhappy specimen of restoration, worse almost than any mutilation, is added to the interior galleries, which we are bound to say are generally superb. The other new room above this, which is to supersede half of the long approach, with its offices, to the reading-room,—a corridor painted and decorated at lavish cost a short time ago,—will, according to present intentions, front on one side, to the flank of the really noble staircase,—which is, happily, to be spared, though its removal was suggested,—and, on the other, along the wall of the equally noble King's Library, and will again be devoted to marbles, yet still without relieving the structure from that offensive hoarding in front. This will necessitate the removal of the two *conciergeries*, as they may be termed, and of the ladies' room, with regard to the successor of which great dissatisfaction is expressed, and we cannot but look upon the arrangement as temporary. A comfortable chamber for the purpose was prepared, with a female attendant, when the new reading-room was opened in 1857. It was to be for the exclusive use of lady readers. Two or three years ago, the female art-students were admitted, causing much inconvenience by crowding, and a memorial against the change was submitted last year to the principal librarian. Nothing was done; but matters have been made infinitely worse now; for both classes have been turned into an out-of-the-way passage at the side of the staircase, and which, unquestionably, is not suited to its objects. There is to be a third improvement on the upper and highest floor,—the British Museum, imposing though it be, is a building of only two stories,—and this, also, will be assigned to antiquities. It would, of course, have necessitated the disturbance of a great range of natural history cabinets, had not their removal been simultaneously determined upon; but Bloomsbury begins to breathe at last, and the trustees feel that they have a clear field before them. That they are in earnest is indubitable. Their architect, contractor, clerk of the works, draughtsmen, and workmen, constitute a perfect invasion, and it must be long before peace is restored in that erudite region. But it might be well, before the process has gone too far for criticism, were a question or two put in the House of Commons upon the subject. The public, which supplies the money, has a right to know how it is about to be expended, and there can be no conceivable reason for any mystery in the matter.

There are few topics, not imperial in their nature, upon which more has been written and said than this of the British Museum. Its annals have passed their centenary, and endless have been the commissions, committees, reports, representations, petitions, and pamphlets relating to it. The destinies of our public structures, indeed, are often strange. "The new House of Commons," wrote an architect, several years ago, "surrounded by hall and corridors big enough for the manœuvres of brigades, cannot pack its members." The Museum, to a certainty, cannot pack its treasures. It was contracted for originally at 290,000*l.*; whereas its cost stood, a quarter of a century ago, at 700,000*l.* The architect had, virtually, no exact design; the portico and columns were not contemplated; one gallery was thrown out here, and another there; excavations were made, and walled and arched in; the inner quadrangle was converted into a reading-room, for the use of which,—though it is flagrantly abused,—men of letters cannot be too grateful; and it seems a pity that monuments, so recently disinterred from the dust of Mesopotamia, should continue to be concealed in the dark, or condemned to subterranean galleries. There may be some truth in the suggestion that many of the antiquities are too ponderous to be placed, with safety, on any of the upper floors. The collection, however, downstairs, beyond the Roman corridor, failed to attract, through the gloominess of the vault in which it is stowed away, even when the contiguous crypt was occupied, to their loss, by a series of refreshment contractors. The public would not dine in that darkness, much less wander among ancient marbles. But where is the relief to be looked for? Among the foundations partly, as it appears; for, although the removal of the natural history collection, and the construction of two new rooms above the ground level, will place a considerable area at the disposal of the trustees, the whole of it will be rapidly overrun. Immense additions are being constantly made by travellers, in the hope that they will be cherished as items in the national property. It is clear that they cannot all be got rid of underground. The first suggestion that occurs is the incorporation of the two wing buildings, now inhabited by functionaries who might surely be housed elsewhere. This would give an extension of at least four large and lofty galleries, and confer an air of completeness on the structure which it is at present far from possessing. These rows of official lodgings are altogether out of harmony with the edifices upon the legitimate purposes of which they encroach. As it is, the works in progress are only nibblings at an enormous mass of overloading. In other directions than that of the official residences, there is little chance of expansion. We could not possibly abolish the grand forecourt, and build up to a line with the street. Elsewhere, incalculable ground-rents, increasing in value, block the Museum; so that, after the alterations actually going forward, the expulsion of the zoology, and the taking in of "the Panizzi Palaces," other processes of weeding may be expected, though the idea is a doubtful one of purging the library of the tons upon tons of trash,—not belonging, in any sense, to literature,—which it indubitably contains. In this respect, the trustees are bound by regulations, and very little discretion is permitted them. Even here "Room! Room!" is the cry, though it may be purchased too dearly. The real integrity of the institution must be preserved, whatever else is sacrificed. The country is proud,—which gives it a right to be jealous,—of the British Museum.

PROPOSED SUBWAY NEAR THE TOWER.

Probably no more important suggested improvement affecting the metropolitan area is contemplated than that now under the consideration of the corporation for the formation of a new communication east of London Bridge. Originating in the desire simply to relieve the over-crowded traffic on the bridge, it became evident that, for the traffic of the large population below bridge, to which this overcrowding is chiefly due, some more direct means of communication was required than the circuitous route by London Bridge, and after much discussion it was finally resolved to reconsider the question on this basis. The consideration of a work of this nature involves many questions beyond those relating to the immediate wants of to-day, and no doubt this subject will be approached in the liberal and far-seeing spirit which has characterised the later works of the corporation. Only fifty years ago it was a question, in a committee similar to that now sitting, whether it would be sufficient to retain the old bridge or build the present bridge. Within this comparatively short time London has more than doubled its area; the south-east has become a populous manufacturing district, and the north-east one of the most crowded shipping centres in the

kingdom. In less than twenty years the new bridge had become unequal to the traffic, and, had other outlets not presented themselves, the consideration of a new route would long since have become compulsory. Changes are now taking place with still greater rapidity; should, therefore, the proposed route offer facilities likely to induce traffic, a traffic equal to that of London Bridge may be developed in a much shorter period of time.

Among the various schemes (chiefly for intermittent traffic) submitted to the corporation is one by Mr. J. Keith, C.E. Mr. Keith assumes a heavy immediate and ultimate traffic, for the reason, as he points out, that in the line suggested, with the new street now in course of formation from Oxford-street to Shoreditch, the proposed crossing will form part of a continuous route from the extreme west of London to the heart of the southern districts, and will also form the connecting-link in an inner circle of main thoroughfares from Westminster Bridge, by Oxford-street, Shoreditch, and New Kent-road, to Westminster Bridge; it in consequence becomes the most direct line south or north-east for the whole of the metropolitan area outside this circle. Immediate relief is thus provided, not only for London Bridge, but for the equally overcrowded central districts of the City, and an impetus is given to improvement over an extended thoroughfare which, judging from recent experience, will materially alter the character and appearance of a large section of a most valuable area of the metropolis.

To avoid long inclines and high lift, unsuited to the heavy traffic characteristic of the district, or interruption by river traffic still more unsuited to a traffic of the assumed dimensions, Mr. Keith proposes a subway. Unlike the Thames Tunnel, the roadway of which is contracted and at a great depth below the surface, this subway would be a spacious arched-over street, 300 yards long, 55 ft. wide, that is, with two 10-ft. footpaths and a carriage-way equal in width to that of London Bridge, and 35 ft. high at entrance, the roof at which would open immediately on the surface. In construction, a double iron shell, the inner of which would be thoroughly dry, and in appearance an imposing underground hall with clear daylight view from end to end; therefore well ventilated; equally capable of ornamental treatment with an overground hall, and by a mode proposed it is believed that it may be lighted by daylight throughout. The entrances, which are treated architecturally, would be approached by handsome open streets, with easy inclines ranging from 1 in 40 to 1 in 70, commencing near Leman-street, on one side, and terminating at the New Kent-road end of Bermondsey, on the other. The sides of these streets would be utilised for shops, warehouses, and such like.

By the mode of procedure proposed, which it is stated has been endorsed by eminently practical men, it is believed this work might be carried out with rapidity, without obstruction to river traffic, and at less cost per square yard of roadway of section from side to side of river than by any other form of construction.

Carried out in the spirit of the design, this would probably be the handsomest subway known, worthy alike of the richest city and most influential Corporation, and if shown to be practicable within the limits stated, would, no doubt, as far as traffic is concerned, solve the question of below-bridge communication.

OLYMPIA.

A LARGE audience was assembled at the Royal Institution on Friday, 19th inst., to hear a lecture from Mr. Newton on the excavations going on at Olympia, and the discoveries that have been and may be expected to be made there. Commencing with a few words as to the geographical position of the site, once one of the most famous and frequented in all the world, now somewhat less known (for he had been asked several times in the past week, by educated persons, where Olympia was), Mr. Newton gave a short sketch, by way of refreshing the recollection of his hearers, of the nature of the prizes and contests at the Olympic games, drawing attention to the extraordinary and, as it must appear to us, disproportionate enthusiasm called forth by successes which might be compared to those of a Captain Webb, a Sayers, a University boat's crew, in the present day,—events which did not certainly evoke the enthusiasm of a nation, or become the theme of the leading lyric poets of the day. But what lay behind this enthusiasm was not merely the immense importance attached by the Greeks to the culture of the body, but also the fact that such observances and games were regarded in the light of religious rites, as things pleasing to the gods; and this was illustrated by the nature of the Pindaric odes themselves, which were never taken up with merely singing the praises and personal achievements of the victor, but always went back to the history of his nation and to the praise of the gods who had befriended it and him, and to whom the honour of victory was due. The point of these remarks, as bearing upon the subject of the lecture, was that the small plain of Olympia, included in the angle formed by the junction of the Alpheus and the Cladeus, was no mere race-course or exercising ground, but a sacred place, and one therefore where it was not surprising that we should find artistic remains of the highest value and interest, and in great profusion.

In fact, the probability was, that a greater number of important works of art had been collected on this site, in the great days of Greece, than had ever been simultaneously collected on any other spot. Not only was there here the great temple of Jupiter Olympius, but we had the evidence of Pausanias, who minutely describes the temple, as to the immense number of statues, those of victors in the games and others, which formerly occupied the site. That many of these treasures had utterly disappeared there could be no doubt; for it was probable that, after the suppression of the games in the third century, the plunder and demolition of the statuary would at once begin, much of the attack upon them being probably a kind of crusade carried on by Christians against these memorials and witnesses of a great pagan festival. During the centuries that had elapsed the ground level had been raised 13 ft. or 14 ft., and the excavation of the objects, which it no doubt contained in abundance, was, therefore, no light undertaking. After mentioning the names of one or two English explorers who had from time to time visited and investigated the site, Mr. Newton described, by reference to a plan, the parts of the temple which had been discovered *in situ* during the excavations recently undertaken by the Germans, and gave a restored plan and elevation of the temple, which was probably approximately correct, but must be further tested by future discoveries. But as to the sculptured remains already discovered, there was a point in regard to them that was curious, and suggested a good deal. It was known through Pausanias, who was careful in transcribing names of the artists from inscriptions, that the sculpture of the two pediments of the Temple of Jupiter was the work of two able and eminent Greek artists. Fragments had been discovered and put together, as already described in our pages, in sufficient quantity to identify one of these pediment groups as one of those described by Pausanias, and representing two charioteers, one on either side of the central figure of Jupiter Olympius, while the extreme angles were filled up by figures representing the two rivers which skirted two sides of the plain. Thus the disposition of the plain itself, the temple of the god as the central object, the racers on either side, and the two rivers forming the boundaries, was repeated, as it were, conventionally or symbolically, on the temple itself; and the position of the two river-gods in the angles furnished another exemplification of the similar arrangement and idea in one of the pediments of the Parthenon. But the significant fact about this sculpture was, that though attributed on pretty safe authority to eminent sculptors, and though the general design had a greatness of style which fully bore out such an idea, the execution and detail were, without doubt, in the judgment of other critics besides himself, coarse and inferior. What was to be inferred from this? Mr. Newton was of opinion that this group furnished a clear proof that works of sculpture were not always executed in ancient Greece by the sculptor who gave the design, and, as it might be said, inspired the work; that sculpture was "put out" for execution in this and (by analogy) in other cases; and that here we had the idea of the eminent artist carried out by the provincial carver. Adjoining the place where this pediment sculpture was discovered was found a single statue, wanting the head and arms, but in sufficient preservation to show that it was the production of the highest art of Greece; and though, no doubt, an immense quantity of what had been there was for ever lost or destroyed, there was every reason to believe that further investigation would lead to the discovery of many more relics of sculpture of equal artistic value with this. A circumstance that gave a great deal of archæological and historical interest to the excavations at Olympia also was the large quantity of bronze inscriptions that were found, which had formed descriptive tablets in connexion with the statues of victors in the games, and from which much curious and some valuable information might be expected. In concluding a very concise and well-arranged lecture, Mr. Newton said a few hearty words in recognition of the spirit and enterprise shown by the German excavators and their Government, to whom we were indebted for laying open these memorials of the great age of Greece, and suggested the desirability of England evincing sympathy with these labours by affording practical assistance, at least in the way of subscription towards the expenditure incurred in carrying them out,—a suggestion which met with the entire concurrence of those present, and which, as readers of the *Builder* need hardly be informed, we fully endorse.

In regard to the remarks offered by Mr. Newton with reference to the poor execution of the pediment sculpture discovered, and his deductions therefrom, we may remind the reader of some rather similar remarks made by Mr. Leighton recently, at the meeting of the Institute at which Mr. Fergusson's paper on the Erechtheum was read, and briefly reported in our columns at the time, relative to the slight variations, not only of execution, but of details of design, in the female figures forming the columns of the well-known porch; which figures, nevertheless, all follow one general design, and are evidently carved from one model. Such incidents as these are of the highest interest in their bearing upon our knowledge of what the process and principle of the Greek sculptor's art really was.

THE LATE MR. DAVID BRYCE, R.S.A.

MR. DAVID BRYCE, the eminent Scottish architect, who died in Edinburgh on the 7th inst., was the last of a school of architects whose influence was such that in all probability they will not be succeeded by a similar class. The profession was not in his earliest days crowded by a host of aspirants jostling each other in the race, but was confined to a few men of mark, each of whom was characterised by a peculiar excellence.

Mr. Bryce was born in 1803, his father having been a builder in good practice in Edinburgh. He was educated in the High School of that city, and having, at an early age, exhibited an aptitude for drawing, he entered the office of the late Mr. Burn, whose partner he afterwards became, a connexion which continued till 1844, when Mr. Burn left for London. After this, Mr. Bryce carried on the business on his own account until a few years ago, when he assumed Mr. Robert Anderson as a partner,—an arrangement which only subsisted for about twelve months, when Mr. Anderson retired from the connexion, since which Mr. Bryce has continued his business in conjunction with his nephew, Mr. John Bryce, who is carrying out the works his uncle had in hand.

The works of Mr. Bryce are distinguished by two leading features,—adaptability to circumstances and position, and propriety of plan and arrangement. Imbued with true artistic feeling, Mr. Bryce was ever careful as to the *ensemble* of his works, and to their fitness for the position they were to occupy, and harmony with the surroundings. When he had a work on hand where anything like scope was allowed to his powers, he wrought upon it as a painter does upon a canvas on his easel, recurring to it again and again, altering proportions, and rearranging the grouping of masses, and in doing this he did not hesitate occasionally to obliterate what had cost much labour.

Perhaps no man in the kingdom has altered more mansion-houses than Mr. Bryce. Many an inconvenient, comfortless dwelling has been by him converted into one of the most comfortable residences, and many a tame, uninteresting, common-place mansion rendered a picturesque feature in the landscape. One source of his success in carrying out such alterations was that he allowed no obstacle to stand in his way, and he was permitted to do what other men would not have dared to suggest; indeed, the alterations were often so extensive as to amount to nearly an entire reconstruction, leaving hardly a scrap of what had formerly existed.

Mr. Bryce was cosmopolitan in style. He has designed buildings of almost every description, and in the most various phases of architecture; but it was in the adaptation of the Scottish Baronial style to modern wants that he was most at home. He may, indeed, be said to have revived the style, and in many of the most picturesque spots in Scotland examples of his handiwork appear. Whatever differences of opinion may exist as to the propriety of using such a style for a modern dwelling, it cannot be denied that it harmonises wonderfully with the Highland scenery, and common sense was not ignored by Mr. Bryce for the sake of style; for the residences designed by him are models of comfort within. Mr. Bryce did not, however, confine himself to this style whilst designing a mansion house; for, upon occasion, he used the Elizabethan, Jacobean, Palladian, and Renaissance styles, all with considerable freedom of treatment.

In public buildings for large towns, such as banks and insurance offices, he invariably adopted either the Palladian or Italian manner, and these are invariably characterised by breadth and solidity of treatment rather than by beauty and delicacy of detail. It was in ecclesiastical architecture that Mr. Bryce was least successful. When Gothic was the style he adopted the influence of the baronial style was seen in the effort to produce picturesque effects, which led to the use of impure and misplaced detail, and an oversight of the proprieties of ecclesiastical sentiment. When, however, he used Gothic for other purposes, he was more successful, as he invariably chose the later phases of the style, which are somewhat allied to the Scottish Baronial. His finest work in this manner is the Fettes College, a building rich in detail, beautifully proportioned, well balanced, and picturesque in arrangement.

Either because his time was so much occupied, or for other reasons, Mr. Bryce declined to enter into competitions. The only instance in which he departed from this rule was in the case of the competition for the Edinburgh Albert Memorial, which he did under pressure. The design he then produced was a characteristic one, being a suggestion for a peel tower for Edinburgh Castle, in a vaulted chamber on the ground-floor of which was to be placed a marble statue of the Prince.

The extent and variety of Mr. Bryce's practice were such that entry to his office was eagerly sought after by young men desiring to study the architectural profession, and many of the most successful architects in Scotland and elsewhere have been his pupils and assistants.

Mr. Bryce was Grand Architect for Scotland, a member of the Royal Scottish Academy, a Fellow of the Royal Society of Scotland, and a Fellow of the Royal Institute of British Architects. He was a man of varied acquirements, and although somewhat rough in manner, he was of a warm genial nature, and his company was much sought after by a large circle of friends. He died at the age of seventy-three, and, although vigorous in intellect to the last, the state of his health had for some years past required him to abstain from over-exertion and excitement. He leaves several works in an unfinished state, the most important of which are the Royal Infirmary and the Union Bank of Edinburgh. The drawings for the former are made, and the façade of the latter is completed, except as to a few accessories.

Amongst his most important works are the following:—

Public Buildings.—1843: Life Assurance Company's Office, Edinburgh (Italian). 1846: Exchange Bank, Edinburgh (Italian); Western Bank, Edinburgh (Italian); Western Bank, Glasgow (Italian); British Linen Company's Bank, Edinburgh (Palladian). 1847: Edinburgh and Glasgow Bank, Edinburgh (Palladian); Edinburgh Subscription Library (Italian). 1850: Surgical Hospital, Edinburgh (Italian). 1853: Standard Assurance Office, Edinburgh (Italian); Dundee Exchange (French Gothic); Fettes College, Edinburgh (French Gothic); Standard Assurance, Dublin; Sheriff Courts, Edinburgh (Italian). 1854: Bank of Scotland, Edinburgh (Italian). 1858: Scottish Widows' Fund Office, Glasgow (Italian). 1872: *Courant and Daily Review* Offices, Edinburgh (Scottish); Edinburgh Royal Infirmary (Scottish). 1873: Lanark Infirmary (Scottish). 1874: Union Bank, Edinburgh (Italian). 1876: Sheriff Courts, Kirkwall (Italian).

Churches.—1840: St. Mark's, Edinburgh (Italian Renaissance). 1843: Episcopal Church, Dalkeith (Early English); Langholm Parish Church (Gothic). 1856: Congregationalist, Dundee (Gothic). 1858: Falkland Parish Church (Gothic). 1852: Dalkeith Parish Church restoration (Gothic). 1857: Crossgates Parish Church. 1855: St. Andrew's, Canongate, Edinburgh (Norman); Alyth Episcopal (Gothic); Free Tolbooth, Edinburgh (Gothic); Carnworth (Gothic); West Coats, Edinburgh (Gothic); Free St George's (Italian); St. Mungo's, Dumfriesshire (Gothic).

Mansions.—1841: Bowerhouses, for Mr. Dudgeon. 1842: Lascar, for Mr. Ronald. 1844: Carradale,* for Mr. R. Campbell. 1845: Liny* (additions), for Mr. J. B. Hamilton; Cloth,* for General Low; Armadale; Strattendry. 1847: Ingharnie,* for Mrs. Ayton; Currattie*; Glenesk*; Ardarrock*; Balfour,* for Mr. D. Balfour; Tollcross. 1848: Allanbank; Guthry Castle. 1849: Cameron Bridge House; Dargavil. 1850: Clifton Hall* (addition), for Sir A. Gibson Maitland, bart.; Portmore (Elizabethan), for Mr. W. F. Mackenzie; Stronvar,* for Mr. D. Carnegy; Sunderland Hall; Coats Hall,* for Mr. G. Napier; Ormiston Hall,* for Mr. D. Wilkie. 1851: Kinnaghame,* for Mr. A. Campbell Swinton; Gilton,* for Mr. R. W. Borrows; Akergill Tower,* for Sir G. Dunbar; Latheron Wheel (additions), for Hon. B. Dunbar. 1852: Panmure (French Renaissance), for Earl of Dalhousie. 1853: Balcaskie* (additions), for Sir R. Anstruther, bart.; Balgregie; Balfour House (additions), for Mr. C. D. Bethune; Maulsden,* for Hon. W. Maul. 1853: Craigneil; Crosch; Eastend (French), for Mr. T. Carmichael; Muckcross Abbey (addition), for Mr. H. Herbert. 1854: Hartrigg* (addition), for Lord Campbell; Kincaid Castle (French), almost entirely new, for Earl of Southesk; The Glen,* for Mr. Charles Tennant; Birkhill,* for Mr. Wedderburn. 1855: Armadale Castle; Oakley,* for Mr. John Sligo. 1856: Torresay Castle,* for Mr. J. Campbell. 1857: Woodcroft,* for Col. Davidson; Pendrich,* for Lord Deas; Capenach* (addition), for Mr. T. Gladstone; Craigends,* for Mr. A. Cunningham. 1858: Eastburgh (French), for Mr. D. Carnegy; Belladrum (addition—Italian), for Mr. J. Merry; Hircock,* for Major Home. 1859: Cullen House (addition), for the Earl of Seafield; Inverardoch (French), for Mr. J. Campbell; Bramkrigg* (addition), for Mr. A. Gilmore; Keiss,* for the Duke of Portland; Maulslie,* for Mr. J. Gosier; Fotheringhame,* for Mr. T. F. Fotheringhame. 1860: Craigflower* (addition), for Sir J. Colville. 1861: Craigleith* (addition), for Mr. Wolf Murray; Ford Castle (addition), for the Marchioness of Waterford. 1862: Langton (Elizabethan), for the Marquis of Breadalbane; Silverknowe,* for Mr. J. H. Mackenzie. 1864: Lone Castle* (addition), for Mr. J. Somerville; Dunira,* for Sir David Dundas, bart. 1865: Auchtifardal*; Ballikinrain,* for Mr. A. Orr Ewing, M.P.; Fin Castle Harris,* for the Earl of Dunmore. 1866: Invergarry, for Mr. Ed. Ellice, M.P.; Halheathe (addition), for Mr. J. Johnston; Ormiston, Belfast, for Mr. J. Combe; Castlemilk,* for Mr. R. Jardin. 1867: Langlee* (addition), for Mr. C. Scott. 1869: Blair Castle* (addition), for the Duke of Atholl; Meiklour (French—large addition), for the Marchioness of Lansdown; Broadstone,* for Mr. J. Birkmyre. 1870: Cortachy* (addition), for the Earl of Airlie; Ellary, for Mr. J. Fox Tarret; Glenapp,* for Mr. J. Hunter. 1872: Trunsland, for Col. Borroughs; Logan House* (addition), for Mr. J. McDonall; Gala,* for Major Scott; Lincluden (now in course of erection).

General.—Mausoleum for the Duke of Hamilton; Monument, in Edinburgh, to Miss Catherine Sinclair.

* Those marked thus * are Scottish Baronial in style.

THE THAMES TOLL BRIDGES BILL IN COMMITTEE.

THE Bill introduced into Parliament by Mr. McArthur, M.P. for Lambeth, the object of which is to abolish the tolls upon the Thames bridges by imposing a tax of five-eighths of a penny over an extensive area around the metropolis, has been before a select committee of the House of Commons during the past and present weeks, and evidence has been given on the subject by a large number of witnesses interested.

Amongst the principal witnesses examined on behalf of the promoters of the Bill was Mr. F. H. Fowler, architect, chairman of the Metropolitan Free Bridges Association. He stated before the committee that so strong was the feeling in regard to the freeing of the bridges, that one of the petitions presented to the Metropolitan Board in favour of it was so numerously signed that it had to be carried in by three men. Throughout the whole of South London, more especially, as well as on the part of those residing north of the Thames, there was a very strong feeling indeed in favour of freeing the bridges, particularly since the progress that had taken place in pulling down long lengths of streets and houses on the northern side of the Thames to make room for railways, stations, and street improvements. Over Southwark Bridge the traffic had greatly increased, whereas it had stood still in the case of Waterloo Bridge, and Waterloo-road had been in a state of stagnation for years, although it was the great leading thoroughfare from the north to the Waterloo Station. It was the axis of the metropolis. In one direction it went right up to the north of London, and in the other direction right down to Surrey. It was one of those lines of communication that ought never to be impeded by a toll bridge. With regard to Vauxhall and Fulham and Battersea Bridges, Battersea Park, constructed at a large expense for the benefit of the people, was cut off, as it were, from their enjoyment. Alluding to the clauses in the Bill providing for raising the sum requisite for purchasing the bridge toll rights and freeing the bridges, he said that both the last and present Governments, having objected to take the coal and wine duties as the basis upon which to raise the money required, the Free Bridges Association had brought in the Bill now before the Committee. As a matter of justice it was thought that the area of taxation for paying for the bridges should be as extensive as possible. The ratepayers of the metropolis proper contributed by means of the county rates to keep up bridges outside, which many of them had never seen, and the proportion which the metropolis paid towards the county rates was very large compared to the total amount. As the cost of keeping up the existing bridges outside the metropolitan area was mainly paid by people in the metropolis, there were good grounds why the area contemplated in this Bill should be as wide as possible. Bridges that had been lately freed outside the metropolitan area had been freed by taxes to which all throughout the metropolis equally contributed.

Mr. Mitchell, overseer of Lambeth, gave evidence as to the great burthen inflicted upon that parish by the toll bridges. In the year 1861 the population was 162,000, and in 1871 it amounted to 208,302, and since 1871 there had been a further increase, according to a calculation he had made, of 25,000, showing a present population of more than 233,000. The working classes formed a large proportion of the population, and on this class the tolls on the bridge pressed heavily. The rateable value of the parish in 1871 was 848,250*l.*, whilst last year, 1875, it was 1,064,000*l.*, which was a proof of its rapid increase. There were 33,000 rateable houses in the parish, and of that number about 18,000 were rated under 25*l.* A large number of those rated above 25*l.* were sub-let, clerks in offices, and others, who were not in a position to pay the full amount, letting off a portion of their tenements. The length of the parish was seven miles, and it contained upwards of 4,000 statute acres. It extended from the Thames at Waterloo Bridge southward to Croydon parish. Many persons complained of the hardship of paying toll, and it bore heavily on those whose work was on the north side of the river, and who lived on the south side. With the view of showing one evil of the bridge tolls, the witness adverted to the break in the line of tramway to Victoria over Vauxhall Bridge. Passengers had now to submit to the inconvenience of getting out of the trams at the Vauxhall end of the bridge, and stepping into an omnibus to take them over the bridge, when they had again to change into another tram on the Pimlico side. If the bridge were freed from toll this obstruction might be remedied. With respect to the gradient, he admitted it was rather steep, but the Tramway Company did not think the gradient would cause any difficulty. Should the bridge be considered too narrow for two lines of tramway, the traffic could easily be worked with one, as it was in the Harleyford-road, near the Kennington Oval, at present. A great number of the passengers over Vauxhall Bridge not only came from Vauxhall, but from Peckham, New-cross, and Greenwich.

Several other witnesses were examined in favour of the Bill, including Sir Henry Peek, M.P. for Mid Surrey; Mr. Blythe, hon. solicitor to the Free Bridges Association; Mr. Applegarth, the secretary; together with other gentlemen connected with the Corporation and the Metropolitan Board of Works, Mr. Baxter, the chairman of the Law and City Courts Committee of the Corporation, incidentally stating in his evidence that the Corporation was largely in debt with reference to the Holborn Viaduct improvements, and that that was one reason why they were strongly opposed to the continuance of coal and wine duties for the freeing of the bridges, for they wanted these duties for the purpose of redeeming themselves from the Holborn Viaduct liabilities.

The chairmen and officers of the several bridge companies have also been examined before the committee, and objected to the Bill on the ground that it does not provide for compensation to the bridge officers and servants.

DIFFICULTIES IN PHILADELPHIA.

WE are sorry to hear, and from more than one correspondent, that the English exhibitors and commissioners are at loggerheads, and that the results may be disagreeable. Mr. Jopling has resigned. Fault is found with Professor Archer, and great regret is expressed that Mr. P. Cunliffe Owen was led to retire. "Had he been here," the cry is, "this would not have happened." We trust that the disputants, for the sake of their common country, will be mutually tolerant and forbearing.

Position of the Fine Arts Abroad.—Some of our readers will be glad to hear, as we are, that Sir Charles Dilke has now obtained the papers he asked for (see p. 484, *ante*), as an unopposed return.

THE SOCIETY OF ARTS CONFERENCE ON THE HEALTH AND SEWAGE OF TOWNS.

THE conference, or rather proposed series of conferences, on sanitary measures, inaugurated on the 9th of May by the Society of Arts (as reported in our pages), is the indication of a serious and persistent effort to throw light on this important subject. No one could have been present in the theatre,—or great room of the Institution,—without being impressed with the sense of earnestness, evinced not only by the presence of the numerous body of men who filled the hall, but by the whole tone of the proceedings. If we permit ourselves to make any remarks which may appear at all of a critical nature, they must not be attributed to any wish to depreciate or to undervalue a praiseworthy movement, which promises to be of no little utility. It is to aid, rather than to hinder, the good work attempted by the Council of the Society of Arts that we wish to say a few words as to the object and the conduct of the meeting.

It was very well that the right honourable chairman should have had such an occasion of showing that the subject of sanitary reform had engaged his serious attention, and that in those points as to which we have had frequently to contest the wisdom of his official action, he shows good signs of re-consideration. Mr. Stansfeld's opening speech showed that one of the great anomalies of Parliamentary government is not without a certain compensation. It is, no doubt, as has often been remarked, a sad waste of power to place at the head of each great public department, on each change of Ministry, a man devoid of special training for the duties of that department. It may be thought even a greater waste of power to remove him (as the oscillation of the pendulum of party usually does) at the end of the four or five years which may have educated him to the level of his functions. But the compensation to which we refer lies in the fact,—very fully illustrated on Tuesday, the 9th inst., that the cool winds of opposition so invigorate the faculties which might be thought to wither and fade in the hotbed of office, as often to give, in an opposition member, a new servant to the country. The ex-minister, who still pursues the subject which it was his duty as minister to learn, brings to his task a knowledge which no outsider can acquire. And when freed, by irresponsibility of position, from those checks and hindrances which it is not prudent, or even possible, always publicly to explain, such a statesman may be enabled, by a double experience, to suggest very valuable measures.

Besides bringing before the meeting the subject and order of the business of the day, the chairman made one or two references to his own views and efforts when at the head of the Local Government Board which were not devoid of much interest to our readers. He stated that it had been his wish to establish a special sub-department in the office, and that he had been prevented from doing so by the humble and prosaic reason that there was not, in the building at Whitehall, a spare room available for the purpose; a reason that now, happily, no longer exists with reference to the noble premises occupied in the new block of buildings in Parliament-street. This sub-department was to be an inquiry office; a room into which any one interested in sanitary matters might enter, to put any question, and to receive such information, whether by reference to books, returns, reports, or other matters, as it was within the power of the department to afford.

In this projected scheme, it will at once be admitted by our readers, Mr. Stansfeld very faithfully echoed the consistent and urgent pleading of the *Builder* since the first establishment of the Local Government Board. But, as is the case with all echoes, there is only a partial repetition. As to the room, and its inmate, we hold it to be an admirable idea. Mr. Stansfeld even suggested that it might be carried out at the building in John-street. But the project is only a part of what is required. Our contention all along has been that the Local Government Board itself ought to be a great inquiry office. That has been the gist of many an argument of ours. From the very nature of the functions of the Board knowledge of what is going on, in all parts of the country, in sanitary work, must accumulate and concentrate thence. What the country needs is that this knowledge should also emanate and circulate there. Now, the proposal to establish a special sub-department for the purpose of disseminating such intelligence shows a perfect accord in principle between the proposer and ourselves. The difference, then, has been not one of principle, but one of the application of principle. The cause why the necessity did not seem so pressing within as without the offices at Whitehall may have been the over-work, or rather the under-handing, of the establishment. One thing, however, is pretty clear, and that is that if the additional room had been at the disposal of the President of the Local Government Board, or if the simple expedient of hiring a room in Great George-street for the purpose had occurred to him, our wishes would have been necessarily complied with. The Respondent at the Inquiry Office (whatever might have been the title of the officer in question) would have found himself compelled to be something more than a mere literary index. He would have had constantly to reply to the question, "What are our neighbours doing?" He would have had to make himself acquainted with the peculiarities of every locality in which sanitary works were authorised; with the schemes of such works; with the outlay on the same; and with the result, both sanitary and financial. All this he must himself have learned, in order to reply to the questions of the public. But it is just this we have all along urged, namely, that it was one of the prime duties of the Local Government Board to supply. It follows that, if there had been but one more room at the disposal of the President of the Local Government Board, the action of that department would have been exactly that which was called for by the *Builder*. On how small a matter may the efficient conduct of a great National service depend!

On one expression that fell from the chairman of the meeting we must speak with reserve. He called the Local Government Board "the Home Office of the future." This may or may not be the case. The phrase, however, expresses a definite policy, and however we may differ as to the aim of that policy, or as to the steps by which it was attempted to carry it out, we must remember that a settled aim is a very different thing from drifting. One of the great points insisted on at the conference was that rash and hasty expenditure should be checked. Our own opinion is, that the creation of a numerous class of entirely independent authorities was an error. Within the past week or two we have had a very striking illustration of the truth of this view. The Surbiton authorities have applied to the Local Government Board for an order to form a united district, comprising about 170 square miles lying between Ealing, Eton, Croydon, and Epsom, which is now under the divided rule of no less than thirty local sanitary authorities. Throughout this area, closely suburban as it is, and covering only about one-thirtieth part of the area of the Thames basin, doubt and difficulty reign unchecked. Even since the report of Colonel Cox, to which we have to refer, has been printed, the Conservators of the Thames have given notice to three of the authorities in question, whose districts border on the river, not to drain into the Thames. Different schemes are under trial in several of the localities. On one thing only did all these authorities agree,—and that was, in the refusal to agree with Surbiton. Ealing and Acton denied the competency of the Local Government Board to take any action in the matter, as the application had been made by one local authority alone, that of Surbiton, and the Act of Parliament required a concurrent application. That objection was not held to be good by the Local Government Board. None the less was the opposition successful. Some centralising, compressing power is needful to make these independent authorities combine, even in self-defence. It remains to be seen whether the action of the Thames Conservancy will have this effect. At all events, at the very moment when Mr. Stansfeld takes occasion for explaining that the policy of the measure of 1872 was founded on the expectation that local government would so far replace any other mode of government that the Local Government Board would become "the Home Office of the future," we are furnished with a very costly proof that no unity of action or combined intelligence of plans is to be expected from these little independent units, and that however desirable it may be for their common and individual interests that they should unite, they obstinately refuse so to do.

Some of the facts elicited during the discussion (or rather the series of questions, as no argumentative speaking was permitted by the rules of the Conference) were of great importance. The arrangement of the Beddington Farm was stated to consist in the discharge of the sewage through brick carriers on to the surface of the several plots of land. The liquid, to use Dr. Carpenter's expression, "filtered through the grass." The theoretic action then consisted in percolating the surface-soil to a depth of not more than 12 in., after which the effluent water was caught by a catch-water drain, and conveyed to another plot of land, over which it was distributed in the same manner. In case, however, of over-supply of sewage, of neglect on the part of the men employed, or of the soil being less absorbent than usual, owing to rain or any other cause, Dr. Carpenter admitted that the effluent matter might flow from the farm without having been through the ground at all, but only having "filtered through the grass." The absolute need of the passage through the soil is a point on which we have always insisted. Dr. Carpenter, however, gave the idea that he attached much more importance to the action of the roots of plants and the functions of vegetation generally than to the oxidising action of the soil. It would be matter of regret to many supporters of the plan advocated by Dr. Carpenter if the matter were placed on this footing. As far as the absorption of nitrogen goes, the plant is no doubt the natural chemist to whose operations we have to look. But the absorption of the nitrogen (in which Mr. Hope intimated an opinion that great waste took place) is one of the least important sanitary functions which have to be discharged in the purification of sewage. The destruction of the albuminous refuse is the great desideratum. This refuse is entirely unfit to form the food of plants, being in fact effete matter which has passed through the state of animal or vegetable tissue. It has lost its oxygen, and cannot be assimilated by any organic action until it has been recombined with a proper dose of oxygen. This, in point of fact, whether performed more or less rapidly, by one method or by another, is nothing less than burning. In large gravel or sand filters, such as those at Swansea, the distribution of the fluid over a very minutely divided surface, bringing it in thin layers in contact with the oxygen of the atmosphere, effects this object. In other methods, such as in that of General Scott, it is only necessary to evaporate the water, and the albuminous refuse will serve as a fuel, and afford sufficient heat for its own combustion. In the cases where the sewage is merely turned into the sea, as in that of the metropolitan sewage, it is left to the constant agitation of winds and tides to oxygenate the diluted matter,—a mode of action which of course has its limits, and limits which it may be very dangerous to approach too closely. But in each and all of these cases the action is that of inorganic chemistry. It is one in which vegetation can take no part; it is the destruction of that refuse which is injurious to vegetable as well as to animal life. The great problem to be solved in any mode of utilising sewage is the separation of the ammonia, the nitrates, and the phosphates, which form the proper food of vegetables, from the effete albuminous matter which is their poison. When sewage is turned directly on land, it is only by passing through the soil that this can be effected. Dr. Carpenter admitted that he should not allow the effluent water from the Beddington farm to be used for domestic purposes. He observed that it was possible that diluted, but otherwise unpurified, sewage might escape into the Wandle. The absolute destruction of the poisonous matter is, there can be no doubt, a more important object to effect than the utilisation of the chemical elements that are of value. It is thus certain that very much consideration has yet to be given to this part of the subject.

For the rest, the two points in which the proceedings of the Health Conference are weakest are these:—Want of time, and want of systematic cross-examination. No one could be present at such a meeting without being made aware of the value of the information communicated, and of the opportunity offered for putting questions. But the time required for an exhaustive examination of each case is so great, that a couple of days devoted to the subject could make but little impression on the work to be done. The whole of the first sitting, or the first day up to lunch-time, was occupied by the address of the President (which no one could have wished to be shortened), and with the account of two places, Cheltenham and Croydon; and as to these, while there was a great amount of information, both communicated in the first instance and elicited by questions, there was a manifest want of that kind of contradictory cross-examination which is conducted by counsel

in a court of law, or before a Parliamentary Committee. It may seem almost paradoxical to say that the harmony and accord evinced by the meeting militated against obtaining the best results from its work; and yet to a certain extent such must undeniably be the case. It has to be remembered that we have as yet made but little progress in determining the laws of the subject. The very fact that so many different modes of removing and of disinfecting sewage are before the world, and that as yet there is no accord as to what is undeniably the course most proper to follow, shows that much has yet to be fought out. It is our object that such contention should be scientific. But the result can only be attained by a certain amount of opposition. This element the very harmony and good feeling of the meeting made conspicuous by its absence; and so far there is something yet to be desired.

Mr. Stansfeld told the meeting that he had called at the Local Government Office, and expressed a wish that that Department should be represented at the Conference by some of the engineering inspectors. The Department expressed sympathy with the objects of the Conference, but it was explained that the attendance of any of the inspectors was difficult. We may remind our readers, however, that Mr. Rawlinson did afterwards attend, and made some remarks, reported by us last week.

We trust, however, that the idea of an Inquiry Office will not be suffered to fall to the ground. It very little matters in what manner this important object be at first attempted, so that it really be efficiently accomplished. In matters of engineering, and in matters of chemistry, difference of opinion is only another name for want of knowledge. No one has any difference of opinion as to a known process,—it is only when the *rationale* of a process is not understood that any doubt or difference arises as to the conception formed of it by competent men. The sanitary difficulty is one that tends eminently to settle itself, so only that we listen to experience, store up facts, co-ordinate, and explain them. No individual, and no body of individuals can fulfil this function with the ease, thoroughness, and lucidity with which the Local Government Board can provide for the discharge of that duty. Having all along insisted on this fact, it is now very satisfactory to find the late president of the Board expressing the same opinion. We have before said that we owe gratitude to the Society of Arts. Every fresh contribution to our knowledge is of value, and the proceedings of the recent conference have afforded many such contributions. But we must not lose sight of the necessity of an exhaustive, contradictory, and systematic investigation and summary of all that has been done, as well as of all that is doing in the matter, and we trust that the good effects of the meeting will be felt, not only by those who took part in its proceedings, but by the country at large, and by the Local Government Board in particular.

THE BERLIN NATIONAL GALLERY.

"THE new National Gallery in all its details and considered as a whole may be looked upon as a triumph of German art. Architecture, sculpture, and painting have here contended, and poured out their most beautiful and richest gifts, as if to prove to our own age and to posterity that the German people are not only able to win victories in the field, but are the equals of other nations also in the gentler arts of peace."

It is thus that the Germans themselves somewhat proudly speak of their new National Gallery in Berlin, the portals of which were opened on March 22 of this year. It was one of the favourite projects of Friedrich Wilhelm IV. to make Berlin a centre of artistic creation, and thus hide the harsh outlines of the military state beneath the many-hued folds of the Muses. The inscription, "To German Art," may be seen far and wide, near the Royal Castle in Berlin, towering in golden letters over the group of buildings which is to serve as a hall of fame for the producers of art from all parts of the once more united German Empire. This Corinthian building was planned already by the late King of Prussia, to whose brother, the first German Emperor from the house of the Hohenzollerns, however, it was left to carry out the designs.

King Friedrich Wilhelm III. had, with the erection of the old Museum in the Lustgarten—a legacy of Schinkel's, and one of the finest architectural ornaments of Berlin, — already made a beginning in the execution of those constructions which, in accordance with the desire of Friedrich Wilhelm IV. and the plans of the architect Stüler, were to unite, in the centre of the city, but "far from the noisy traffic," all the buildings devoted to the arts and sciences, and which were to be in connexion with the building of the cathedral and its "Campo Santo," and thus form a meeting-place for the highest intellectual interests of the people. In 1841 the buildings situate behind the Museum on the so-called Packhofsinsel were purchased, amongst them the residence of the well-known Frau Sarah Levy, in whose *salons* congregated the Humboldts and the Grimms, Boeckh, Schadow, Varnhagen, Rahel Henriette Herz, and many other celebrities of that time. But the plan seemed very little advanced with the purchase. The following years, we might almost say decennials, were very little favourable for the execution of the plans of ideal art. The waves of political events rose too high to give full scope to the requirements and claims of art, and when at last, after the halls of the new Museum had been opened for over ten years, the building of the National Gallery was commenced in earnest, the first intention of erecting it in a secluded locality had been long frustrated. Opposite to the site, the new Exchange had risen out of the ground, the Friedrichsbrücke had been widened, Berlin had increased in a manner quite unexpected, and life near the Castle, Museum, National Gallery, and Exchange had become almost the loudest and busiest of the capital.

Building operations were begun at the commencement of 1866, but they were repeatedly interrupted by the war of that year, and again by the campaign of 1870–71, as well as by strikes. The architect Stüler had died in the meantime, and the direction of the work was confided to a commission, of which only two, the architects Erbkam and Strack, survive its completion. The building is a pseudo-peripteros (a structure surrounded by a facing of columns) in the Greek style, Renaissance forms, however, being also introduced. On a basement, 40 ft. high, of grey granite, rise two stories of red sandstone, the roof being supported by fluted Corinthian columns. The principal front, of 100 ft. long, has a portico of columns, and is ornamented by a frieze in relief by Moritz Schulz, on which are represented, three-quarter size, figures of the most celebrated German artists. The tympanum of the portico, which is to receive an equestrian statue of Friedrich Wilhelm IV., has been sculptured by Wittig. Flights of steps lead up to the principal front, at the foot of which are two groups by M. Schulz, representing Sculpture and Painting, while at the top are two female figures, the "Purpose of Art," by Calandrelli, and "Creating Sculpture," by Moser. The side fronts of the building, 200 ft. long, are intersected by attached Corinthian columns; these rest upon a sober substructure, and are crowned by a rich entablature, with the names of artists inscribed in large gold letters. A half-round apse, in the same style of architecture as that just described, closes in the building at the rear. The whole building, to provide a proper light for its many rooms, has been set back towards the new Museum, and in the midst of the colonnades either already existing or still to be erected. The space thus created between the latter and the new National Gallery will be made into ornamental grounds, in which marble statuary will be placed.

The interior of the building is gained by two principal entrances, one leading by a carriage-approach, between granite columns, to the first principal story, the other over the geometrical staircase already mentioned to the second story. The former conducts to the lower vestibule, in which columns of white Carrara marble support a ceiling formed of bays of natural-coloured zinc, here for the first time applied for this purpose, the floor and breast-wall being of the same stone, polished, which contrasts effectively with the walls of brown glazed stucco. On both sides of the vestibule are the cloak-rooms. Over the entrance to the rooms is, in high relief, the figure of Germania protecting the arts, and raising her hands over the genii of Architecture, Painting, and Sculpture.

A transverse gallery is first entered, in which a door on the right leads to the principal picture-rooms; on the left, to the rooms containing sculpture. The transverse gallery itself has a surprising effect, with its columns of black Belgian marble, its walls of yellow *stucco lustro*, and its vaulted ceiling painted richly in gold and red, to which representations from the "Nibelungen Saga," by Ewald, of Berlin, form a favourable contrast. This gallery is to receive the larger works of sculpture. The walls of the picture-galleries, to the right, are covered with red tapestry, its floor is inlaid with oak panels, and its ceiling is in white and dull gold. The lighting is in accordance with Magnus's principle, the paintings being hung in a sloping direction. On the left is the gallery devoted to sculpture. This also is most richly executed. Corinthian columns, of red Belgian marble, with base and capital of Carrara marble, support the vaulted ceiling, of a grey colour, adorned with mosaics, the walls being of dark green *stucco lustro*, and the floor of Mettlach tiles. In the window-niches are relief medallions, by Landgrebe, from the history of Greek sculpture. Throughout the whole arrangement of the interior one distinguishing feature strikes the observer: all entrance-halls are as richly decorated as art can make them, while the rooms destined for the reception of art-treasures are kept in a more sober and quiet style, so as not to interfere with their effect.

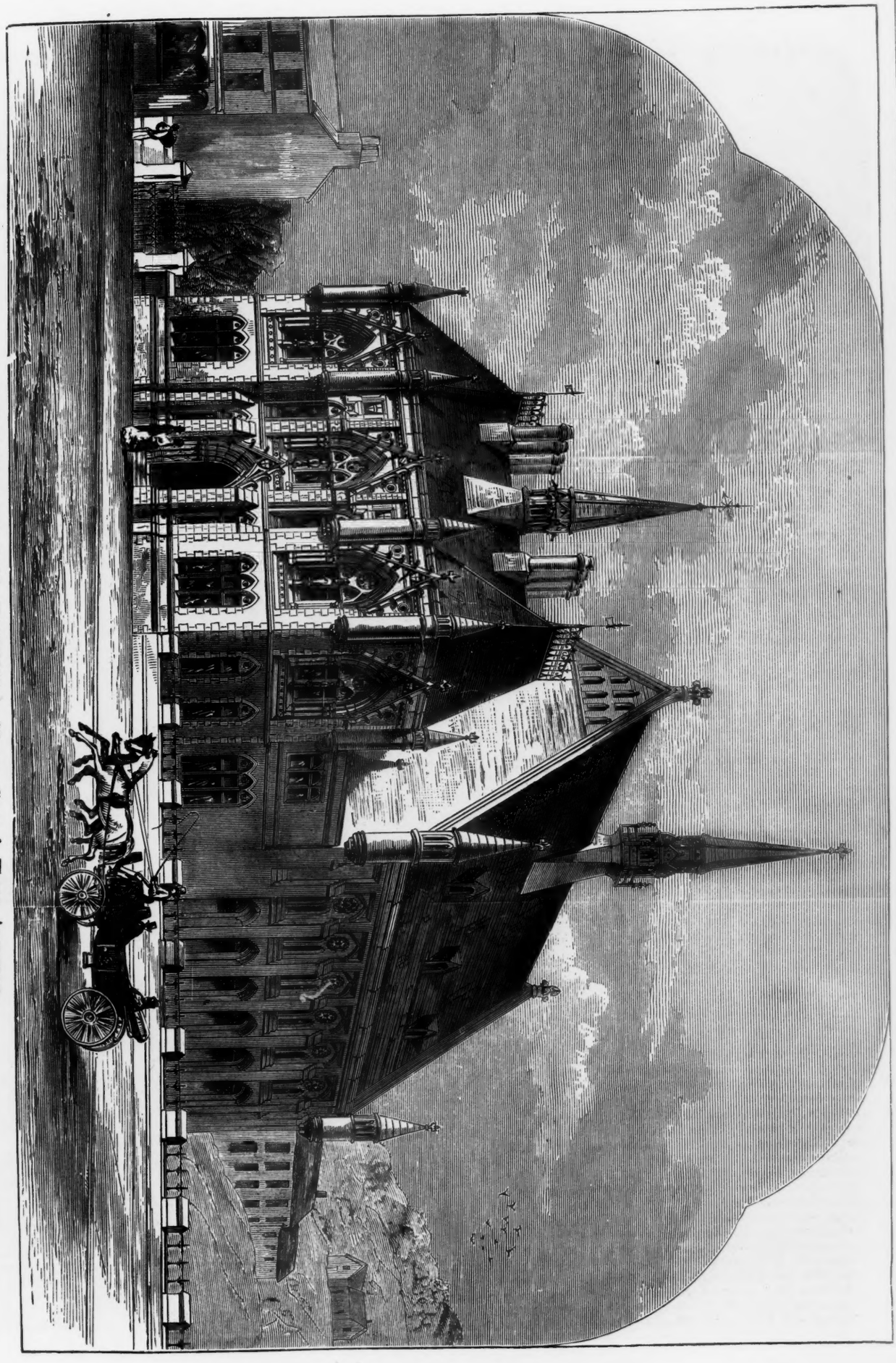
From the lower entrance-hall broad stairs of polished white Carrara marble lead to the second principal story, and first to the upper vestibule, which may also be reached by the great stairs from outside. The upper hall is similar to the lower, but the columns are of the Ionic order, a frieze containing illustrations from German history, executed by the sculptor Geyer, filling the space over the stairs. Through this we enter a hall with a dome-shaped ceiling, lighted from above, the cupola of which is painted with the signs of the zodiac, by A. von Heyden. The four entrances are flanked by eight projecting columns of black, green, and white veined marble; they support each a muse modelled in gypsum by Calandrelli and Brodwolf. Four niches are to receive sculptures. Over the entrances are paintings, also by A. von Heyden, representing Architecture, Sculpture, Painting, and Music. Over the side entrances are two reliefs, in which the portraits of Strack and Erbkam, the surviving architects of the National Gallery, may be distinguished. From this exceedingly beautiful space the first principal gallery is entered; it is lighted from above, and kept very sober, as it contains the Cornelius cartoons on Scriptural subjects, which were destined for the Campo Santo and the Cathedral. In the second room, kept in the same style, and decorated in a similar manner, are cartoons of the same master, the subjects of which are taken from Greek mythology.

The story above this contains the same number of galleries, arranged in a similar manner. All these rooms have inlaid floors, walls covered with different-coloured tapestries, and simple ceilings. Looking from the corridors on both sides of the great gallery in this story, an effective view is obtained of the whole.

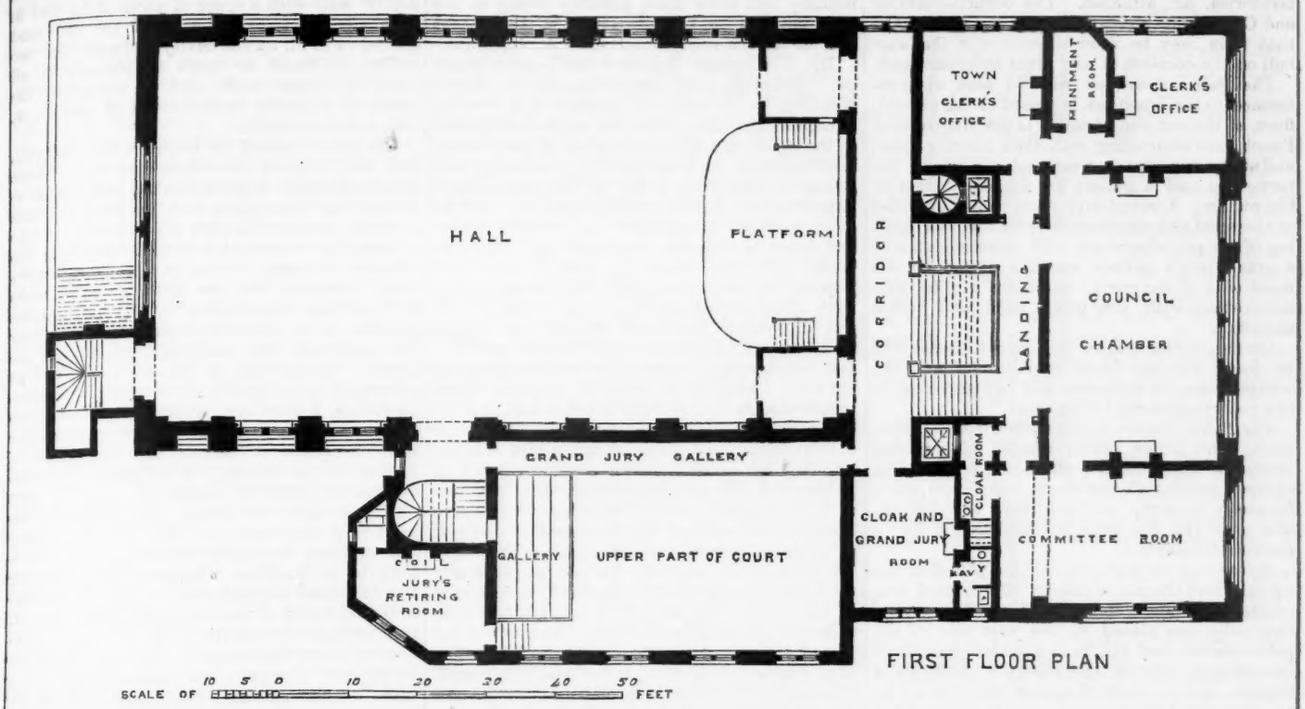
The several stories are connected further by two smaller staircases; a lift also supplies ready communication between them. The warming of the building is effected by hot-water apparatus from the basement, in which are also the apartments of the staff, offices, packing and store rooms.

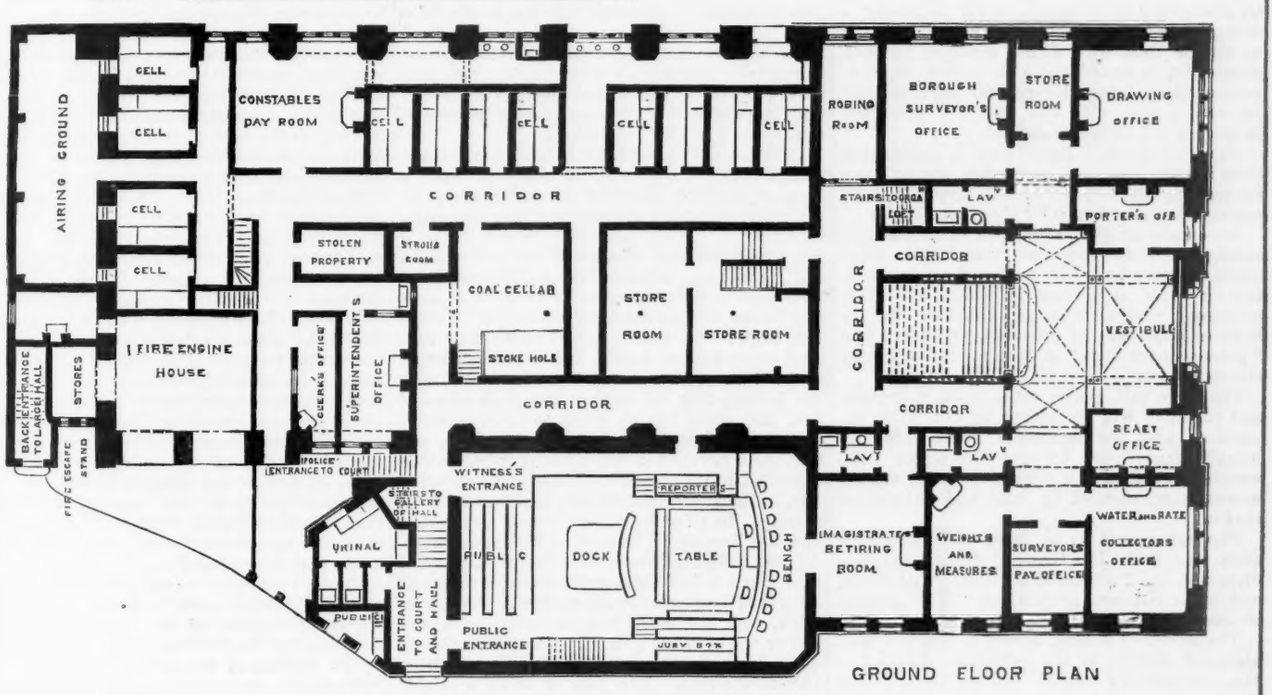
This, in short, is a hasty sketch of the throughout richly-executed home for German art, of which we give an illustration. But still greater plans are yet in preparation. The space in the old and new Museums no longer suffices for all the art-treasures acquired from time to time. The picture-gallery in the Schinkel Museum has grown to such dimensions by fresh acquisitions that a separate building for them has become indispensable. The space thus gained would give room for the collection of antiquities now crowded together in the *souterrain* of the Schinkel Museum, and would also provide accommodation for the sculptures which will soon begin to arrive from the excavations at Olympia. The rooms in the new Museum are also no longer sufficient for its ethnographical collections. The latter have increased to such an extent that the Government has the intention of erecting an especial Ethnographical Museum. But the greatest change will be effected by the construction of the new railway through Berlin. To describe, however, in detail all these vast plans would take up too much of our limited space at present, and must be left to a future article. But we may be permitted to add that it seems as if the plans which Friedrich Wilhelm IV. once matured for the transformation of the centre of Berlin will at last be carried into execution, but in a far grander manner than he ever contemplated. We shall give other illustrations.

THE BERLIN NATIONAL GALLERY: STAIRCASE.



PROPOSED TOWN HALL, HASTINGS.—MESSRS. CROSS & WELLS, ARCHITECTS.





HASTINGS TOWN HALL.

INTENDED TOWN-HALL, HASTINGS.

OUR readers do not require to be told of the numerous discussions which have occurred on this subject, or of the position we felt compelled to take originally in respect of the designs selected by the committee. The Town Council, however, have now definitely arranged to carry out the design submitted by Messrs. Cross & Wells and Messrs. Jeffery & Skiller, as stated in our last issue, and we do not intend to reopen the question. We give in our present number a view of the intended building and plans of the principal floors, accompanied by the architects' own descriptive particulars; and we sincerely hope that the new Town-hall when erected will be found to satisfy fully the expectations of the inhabitants.

Entrances, Staircases, and Corridors.—Upon reference to the ground-plan it will be seen that the principal entrance from Meadow-road is approached through a deeply-recessed archway, fitted with ornamental sliding iron gates, and opening into a groined vestibule, thus communicating by three arched openings with an inner hall, in which will be constructed the principal staircase leading to the large hall and superior offices of the Corporation. On either side of the entrance vestibule there are short corridors or lobbies for access to such of the municipal offices as are placed on the ground-floor. At the end of the inner hall is a corridor giving direct communication with the intended entrances from Station-road, and there are branch corridors and passages communicating with other parts of the building.

Municipal Offices.—Entering from Meadow-road, on the north side of the vestibule will be found the offices of the borough surveyor, his clerk's office and store-room, and an office for the hall porter on the south side. There are offices for the rate-collector, inspector of weights and measures, workmen's pay-office, and a spare office, and there are lavatories, &c., for the accommodation of each suite of offices.

The council-chamber and committee-room are placed on the upper floor, adjoining which are the offices of the town clerk, a muniment-room, and the necessary lavatory accommodation.

The Large Hall will be raised 11 ft. above the general level of the ground-floor, and will be approached from three separate entrances by short flights of stairs. The principal entrances will be from Meadow-road, by the grand staircase before described. There will be a secondary entrance and staircases from Station-road, opening into the middle of the hall; another at the extreme end, communicating direct with the back seats; and there will be a private entrance and stairs leading direct on to the platform. Annexed to the hall will be corridors connecting the several entrances one with another, and for the purpose of affording ready access and egress to the largest number of people the hall would contain without obstructions to other occupations. The performers' or lecturer's platform will be at the east end, with private retiring-rooms underneath, below the hall floor, and an organ-loft behind. Level with the hall will be

found cloak-rooms for ladies and gentlemen, with lavatories, &c., attached. The council-chamber and Corporation committee-room are so arranged that they may be used *en suite* with the large hall on the occasion of any great entertainment.

The Police Court, as will be seen upon reference to the drawings, is placed on the ground-floor, at the east end of which is the Magistrates' Bench, communicating with their retiring-room, and at the opposite or west end are placed the jury-room and a gallery for accommodation of the public. A grand-jury room is also provided at the level and approached from the half landing of the principal stairs, with communication to a grand jury's gallery, which is placed on the north side of the court; and there will be communication with the police cells and police station.

On the north side of the main staircase will be found the barristers' robing-room, and the waiting-room for witnesses will be found close to the public entrances to the court.

The Police Station is approached from Station-road. The police offices consist of superintendent's office, clerk's office, office for night charges, constable's day-room, lamp-room, room for stolen property, and residential accommodation over the fire brigade department for a married constable.

Police Cells for night charges are placed on the north side of the police station with covered area adjoining for light and ventilation. The detention cells are placed on the west side of the police station, and will be in two tiers, one above the other, to suit the irregularity of the levels of the site, and to admit of spaces being found for an airing-yard for prisoners, and if necessary, a drill-ground for constables. It is intended to fit up all the cells with doors, windows, benches, closets, &c., in accordance with modern improvements and the latest Government requirements. In conjunction with the cells are prisoners' lavatories and an airing-ground.

The Fire Brigade Department is approached from Station-road, and comprises engine-house for two engines, firemen's room, firemen's store-room, and a pent-house for the escape ladder.

In completing the description of the several arrangements, the architects remark that underneath the large hall will be found accommodation for coals, store-room for chairs, and other necessary conveniences. A chamber for the heating apparatus is provided, and there is a "public convenience" at Station-road adjoining the open yards.

The large hall, police court, cells, staircases, and corridors will be heated by hot water apparatus, and the municipal police and fire brigade department by open fire-places. The ventilation will be as much as possible by natural means, supplemented by inlet and exhausting shafts.

The exterior is to be faced with local blue stone with Bath (Box Ground) window and door dressings, and Portland stone cills, weatherings, and other exposed projections. The several staircases are to be of Green Moor stone.

The tender of Messrs. Howell & Son has been accepted, subject to the reductions detailed in the committee's report printed in our last number.

SOME MODERN IMPROVEMENTS IN HOUSE BUILDING.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association, held on Friday, the 19th inst., Mr. John S. Quilter, president, in the chair, Mr. A. G. Hansford was elected a member. A vote of thanks was tendered to Mr. Street, R.A., for accompanying the members over the works of the new Law Courts a fortnight ago. Mr. H. H. Stannus gave notice that at the meeting of the Association to be held on the 2nd proximo he should submit a resolution or resolutions on the desirability of codifying or re-arranging the rules of the Association. He remarked that these rules had been added to or amended year by year in accordance with growing needs. Like all piecemeal legislation, they were heterogeneous and unsatisfactory, and the sooner they were codified the better it would be for the welfare of the Association. Mr. Phené Spiers, in reply to a question put by the President as to the arrangements for this year's Architectural Examination, said that at a meeting of the committee held in October last it was thought advisable that the examination should be held annually, the examiners agreeing to give their services free. At present the subject was in abeyance, and nothing had been done, possibly owing to the time devoted to the discussion of the recent scheme for the re-organisation of the Institute.

Mr. J. Douglass Mathews then read a paper on "Some Modern Improvements in House Building." He said:—I propose this evening to depart somewhat from the subject advertised in the syllabus, and refer to some of the modern improvements in house-building, believing that instead of describing a few of the most recent improvements possibly hardly tried, it would be more profitable to consider the relative merits and demerits of certain materials and improvements that have stood the test of time to a greater or less degree, and with which we all have some acquaintance,—in the hope that, in the discussion that will follow this paper, members will give the result of their experience; and, with a view to prevent the subject becoming too wide, I propose to limit the paper to those improvements that pertain to house-building.

It may be assumed that the objects of inventors in introducing new materials and modes of workmanship for house-building may be classed as follows:—1. To promote health and comfort. 2. To cheapen the cost of building. 3. To save labour in the work of the household. The first is necessary to render a house truly a home, and the advance in scientific knowledge naturally conduces to improvements, especially in reference to sanitation. The second is a matter of considerable importance in these days when the cost of labour, and consequently the production of all hand-made articles, is materially increased. The third is rendered especially desirable, now that domestic service is so little sought by those who, in the natural course of things, are fitted for this work. In order to systematise the paper, I propose to consider the subject as far as possible in the order of the trades engaged in house-building, and without further preface proceed to commence with the foundations.

It is generally admitted that in all foundations, except rock, firm gravel, or compact sand, a layer of concrete should be thrown in trenches, the extremely uncertain nature of clay especially requiring it. Much alteration is now made in the admixture and manner of using this material. Formerly, ballast and stone, or chalk-lime, were used in the proportion of three or at most four to one, and the concrete thrown from a stage 7 ft. high; *now*, recent experiments show that good burnt ballast, broken bricks not exceeding about 2 in. square, and a little sand used with the ballast, may be used in the proportion of five, and some say as much as eight parts, to one of good fresh ground or selenitic lime, and that the concrete sets much better in bulk if it is shovelled into the trenches in layers not exceeding 1 ft. in thickness, instead of being thrown from a stage. In all cases where there is any water, blue lias lime should be used, or Portland cement. A great safeguard to prevent damp rising, and to render a house warm and healthy, is to spread a layer of Portland cement concrete, about 4 in. thick, over the whole site, especially on a clay site or one of made ground. The prevention of damp rising in the walls is a matter requiring careful attention. The plan of using a double course of slates, with three layers of cement, is good if the workman can be trusted to make the beds perfect, and to break the joints of the slates; but in case of settlement the slates will break and the wet find its way up the wall. A strong coating of tar and sand is a good damp course, but the same objection in case of settlement applies to this. Engert's asphalted felt damp course is, I think, as good as any; it is cheap, easy of laying, and will accommodate itself to settlement, but care must be taken to properly lap each sheet. Taylor's stoneware perforated damp course is advantageous, being perfectly damp-proof, and affording at the same time ventilation under the floor, as well as acting as a good bonding course near the base of the wall; but its cost will, I fear, prevent its general use in house-building. The means of keeping a basement dry is a problem that is difficult to solve. The usual plan of a so-called dry area is at all times unsatisfactory; often the covering gets broken and the rain enters, or the area becomes wet instead of dry, thereby causing a damp atmosphere outside the wall, which in time draws through it, and occasions the wall to be constantly wet. If dry areas are used they should have a field drain-pipe laid in the bottom, connected with the main drain, a strong covering not likely to get broken, proper air-gratings used to ensure a current of air all round; and, in case of ties, the ends of the bricks should be coated with tar. A good plan would be to build a hollow wall with a space of about 2 in. tied in with vitrified bricks, and liquid tar and sand poured in to fill up the cavity between the two walls. It would be more satisfactory in all cases if cement were used for rendering the inside of basement walls instead of plaster, or, better still, asphalte.

The great demand for bricks in the metroplis, and the frequent transformation of suburban brickfields into "eligible building land," cause at times great scarceness, and, by reason of land or water carriage, always considerable increase in the price compared with that formerly. The adoption of some other, or at any rate additional, material for the construction of walls is, therefore, forced upon us, and this material appears to be concrete, which, I believe, may be considered the building material of the future. Of its use in former times, and its advantage as a building material for modern dwellings, I have had occasion to speak before in this room, and its extended use during the last ten years affords us the opportunity of finding out its merits and defects. The introduction of Portland cement and selenitic lime has done much to enable this material to be used in a way that it never could have been had ordinary lime only been available; but it may be a question whether, notwithstanding the increased strength and consequent decrease in the thickness of walls obtained by the cement, it is desirable to risk its use in such small thickness as some suggest and adopt, as the whole strength of a concrete wall is dependent wholly upon its homogeneity, which may be disturbed by imperfect foundations or other causes. The methods adopted for its use hitherto have been principally in the monolithic form, by constructing temporary trenches by means of sliding uprights and boards, and filling in about 2 ft. each day. One of the advantages claimed for this process is, that, as the scaffold is supported by the wall built the previous day, should there be any fault in the cement or in the admixture of the concrete, it is at once found out. The chief drawback is the expense of the apparatus, which, however, would be greatly reduced in proportion to its extended use. To obviate this expense an apparatus has been patented whereby the boards used for the roofs or scaffolding may serve as temporary trenches, and the uprights to support them made to slide as telescopes, instead of being set up so frequently, as by the other plan; but this method has not the advantage of proving bad work so readily as the other, and in concrete building, more, perhaps, than in anything else, good work is an absolute necessity. There is no doubt that the only way to use concrete as an economical material, and as one cheaper than bricks, is in the monolithic form; but I cannot help thinking that it would be safer, if not more lasting, to use it as a filling or core, the wall being built in such a way that proper bond may be preserved, as, for instance, by cement blocks cast hollow. Terra cotta might be also used for the facing only, trusting to the concrete for the strength of the wall. A system of this kind has lately been introduced by Mr. Sellars, of Birkenhead, the blocks being formed of a concrete composed of sand, stone, and Portland cement, and each block bonded to the other by means of a kind of beaded tongue and groove. Tiles L-shaped, and of the size and texture of an ordinary brick, are made, which are built in courses as bricks on the outer and inner face of the wall, and concrete filled between. Ordinary bricks have been used as an outer and inner face, with bonding bricks or courses at intervals, and the cavity filled in with concrete, but these methods are all more or less expensive, and can only be cheaper than ordinary brickwork where great thickness is required for strength or appearance. In passing through Staffordshire and other iron counties, one cannot but be struck with the apparent waste, not to say defacement, of the country by the mountains of scoriæ from the furnaces, for which little or no use has yet been found, but in the economy of nature this cannot be intended to remain long without a purpose. Why may not this be used in the manufacture of hollow blocks such as I have mentioned? The answer, doubtless, would be that, when exposed, the weather would act on some of the ingredients, and disintegrate, and finally perish them. If this is so, is there no system of indurating or water-proofing, such as Ransome or Szerelmey *has* invented, or as some equally enterprising person *could* invent? This method would admit of considerable variety of architectural treatment, as the blocks could be cast with any ornament, sunk or

otherwise, and would have the advantage over a cemented front of being truthful in appearance, on account of the building being erected course by course. Whilst speaking of architectural treatment I may remark that some of Soane's or the Adams' buildings may be studied with advantage in ornamenting concrete, as flat or slightly projecting features are far more suitable than heavy ones; and for this purpose sgraffito has been used with very good effect in some recent buildings,—an example which will no doubt be largely followed. One great impediment to the extended use of concrete by architects is the necessity for cementing the external face. But I believe this arises a great deal from prejudice, as the value of cement as a material is admitted on all hands; and, had it not been used largely as a cloak to hide bad work and materials, and in a manner to imitate stone, I venture to think it would have been considered a fair and legitimate method of facing and ornamenting buildings.

The necessity of adopting some new material for a general roof-covering is almost as great as for walling,—at any rate, if the supply of slates continues as short and the price as high as at present. For general purposes there is no better material than slate, chiefly on account of its lightness, and the comparatively flat pitch at which a roof can be constructed, both of which tend to lessen the cost of the timbers of the roof. For appearance and comfort, tiles are preferable, but they require a sharper pitch in the roof, and, being much heavier than slate, are more expensive both in original cost, in labour in laying, and in the strength of roof-timbers. A lighter roof is formed by the Broomhall tiles, which also have the advantage of being fixed easily; but the price is too high for general use. Recently the Somerset tiles—such as the corrugated, Roman, &c.,—have been much used about London, and, as the price is very little more than the ordinary pantile, and the labour in laying the same, they have been largely in demand for covering small houses. If a superior tile were made, of a better and more uniform colour, they would doubtless be greatly used. These tiles require torching on the inside after laying, and their chief defect is the very small lap to each tile. They are very porous; but I believe a coat of tar on the inside is a great improvement. A tile has lately been introduced, called the bonding roll roofing tile, which, according to the description, has the advantages of breaking joint, and thus preventing wind-stripping, a perfect bed, the corners not cut, and the ease with which the new tiles can be inserted. The price is moderate, and if the colour is good, it appears to me to be likely to supply the demand now created. The designs for the tile ridges are much improved, and the cleverly-modelled finials and terminals lately introduced add wonderfully to the effect of the roof.

Before considering the construction of floors I may remark generally on the difficulty of getting well-seasoned timber. In no way is the effect of competition shown more strikingly than in this: timber is, in many cases, brought direct from the dock to the ground, cut up and used at once in the building, shrinkage ensues, and cracks in plastering of partitions, ceilings, and sometimes in brickwork, are the necessary result. Formerly a builder would keep timber for years in his yard before use; but, except with large firms, capital is too valuable to allow of its lying idle in the shape of timber stacks.

There are many advantages in the use of a concrete or iron floor; and here, again, I would say that I believe concrete is capable of further development. The system of fireproof flooring has been much cheapened by the use of rolled joists, filled between with slabs of concrete; but the cost, however economically used, compares unfavourably with an ordinary wooden floor, chiefly on account of the boards and joists. Homan's or Phillips's plan of laying iron joists 2 ft. 6 in. apart, filled in between with concrete, and rendered doubly secure by the use of light T bars, varying from 2 in. to 12 in. apart, makes a good and economical floor. A plan adopted by Messrs. Moreland is to lay strong iron joists or girders about 8 ft. distant, with light iron bowstring girders about 2 ft. 6 in. apart. The concrete passing through the interstices of the iron truss forms one continuous slab from wall to wall. The most inexpensive mode of forming concrete floors that I have seen is that invented by Mr. Allen, and used in the Waterlow dwellings, which consists of rolled iron joists about 6 ft. or 8 ft. apart, with a wrought-iron bar, about 3 in. deep, laid on top; this is drilled for, and light iron rods, about ½ in. diameter, run from one to the other, and the whole is encased in concrete 6 in. deep. In each of the foregoing the ordinary wooden floor is laid above with shallow joists. Mr. Lascelles has recently patented a plan by which concrete is used in slabs or tiles, and when used for a floor the tiles are laid on iron or wooden joists the width of the tile apart. The slabs being faced on both sides serve for floor and ceiling at the same time. I believe in some concrete houses the floors have been finished with Portland cement, and a fillet laid round the room flush with the floor for the purpose of nailing the carpets. If wooden borders are required, parqueterie or ordinary wood could be laid round, of the width required, and the moderate price at which this material can now be obtained, compared with the effect produced, is a great inducement to its use. If an entire wooden floor were needed, wooden blocks or bricks about 1½ in. thick (introduced by Mr. W. White), similar to those often used in schools and churches, make an excellent floor. In all basement floors the use of the solid blocks, properly Burnetised, is recommended, because their use does away with the need of ventilation under the floors, which is often very imperfect, and it also saves at least 12 in. in the height of the walls all round.

A substitute for the wood-framed quarter partitions is much to be desired. It is impossible to divide all the rooms on the upper stories in the same manner as below, and therefore brick walls cannot be carried through the house. To meet the difficulty, partitions must be used, and these are best formed as a truss, throwing the weight on the walls rather than on the floor. If these partitions are formed of timber, shrinkage is sure to take place, and with it cracks in the plastering of walls and ceilings, which, to say the least, is unsightly. A truss formed of iron and the partitions built in hollow bricks or concrete blocks would answer the purpose if cost were not an object. Wherever partitions are set one above another, or on brick walls, it is best to use nogged rather than quarter partitions.

One of the advantages of railway conveyance is the increased facility for procuring stone. This is proved by its almost universal use in dressings, even in small houses. The stone to be adopted must, of course, depend on the locality, and before building care should be taken to ascertain the relative advantages and disadvantages of the local stone.

Two or three kinds of artificial stone are manufactured, and which are really concrete. Ransome's Patent Concrete Stone, which has been the longest in use, has for a time, at least, I believe, ceased to be made in London. This, however, I think, arises more from the difficulty of overcoming the prejudice which exists with all new materials than from faults in manufacture. A stone of a somewhat similar nature, called the "Patent Victorian Stone," has been more successful, probably because the manufacturers laid themselves out more for the practical than the artistic. Much of the paving, sinks, &c., made by this company, some years ago, have stood the test of time well, and in cases where repetition of an article is required it competes successfully with natural stone. Another artificial stone, which is concrete composed of coal breeze and Portland cement, is made by Mr. Matthew Allen, who claims for it extreme durability, and recommends its use in steps, paving, &c.; and, being a moulded material, the cost is much less than stone.

Terra cotta as an ornamental material has not found favour to the extent its strength and durability demand, but for ordinary work this is scarcely to be wondered at, as the expense of modelling, moulds, &c., in addition to the actual casting, is very great, so that even with a fair amount of repetition its cost exceeds that of stone, and this, added to the uncertainty in delivery and risk of imperfect castings, causes it to find but little favour with the ordinary house-builder.

The introduction of selenitic lime is a great advantage to plasterers, as its quickness in drying enables each coat to be followed on almost immediately, thereby saving much labour in shifting scaffolds, &c. Whether it fulfils all the advantages claimed for it, is a matter which my own experience will not allow me to say, but having adopted it on several occasions I am satisfied with the result.

The use of carton pierre has largely increased as an ornamental material to supersede plaster, and the castings are as a rule sharp and well executed; the lightness of the material, and the ease in fixing are also advantages in its favour, but, like all cast materials, it requires care in fixing, because, being in short lengths, the lines are not always perfectly true.

It is somewhat remarkable that no substitute has been found for the ordinary plaster ceiling. Two materials more opposed to each other than timber and plaster could hardly be found—the one almost naturally deflecting, and the other as surely cracking. Possibly the chief, if not the only, reason for its continued use is that plaster is in a great measure fire-proof. If some such material as carton pierre could be made fire-proof it might be screwed up to the ceiling in slabs, and, if necessary, the joint covered by an ornamental moulding or rib to form panels. Since writing the foregoing, I find that a system has lately been patented which in a great measure meets my suggestions. Mr. Hitchins forms slabs about a yard square, prepared in a somewhat similar manner to carton pierre, and secured with zinc nails to the joists; the slab being rough has a setting coat either in plaster or Parian cement laid on in the usual manner, after it is fixed, which effectually conceals the joists. The edges of the slabs being bevelled, each one forms a kind of dovetail into the others. A ceiling by this means is very quickly and cleanly put up, and the cost is very little beyond that of ordinary plaster.

The substitution of cement for wood skirtings is an advantage, preventing a harbour for vermin and a run for rats and mice, and, if used with a concrete-floor, these undesirable domestic pests would be almost exterminated.

Notwithstanding the enormous increase in the cost of almost every building material during the last few years, the ordinary joiner's work proves in a great measure an exception; this is accounted for by the admirable machinery which has from time to time been invented for saving manual labour, and which has now arrived at that state of perfection that a door may be prepared in every part, even to the sand-papering, by machinery, excepting only the wedging and pinning together and mitreing the mouldings. The circular band-saw affords great facilities for executing ornamental fret and curved work, at a very moderate price. Machinery being now so generally used, joiners' work should be specially designed for its manufacture in this manner, as handwork, such as special mouldings, greatly increases the cost without in the ordinary way producing a corresponding effect, and especially as the cost of making a special plane for working mouldings to design is in most cases almost nominal.

In no part of the inside of a house has more care been of late bestowed than in the design of the staircase, and, it must be admitted, with satisfactory results, the newels and balusters affording a good opportunity for architectural treatment; but it is worthy of remark that the too frequent use of sinkings and muliplication of small mouldings, although effective in drawing, and possibly in execution, should be avoided, as they form capital receptacles for the accumulation of dust, which in a short time becomes a cake of mud.

The introduction of hand-painted tiles has been the means of causing the stereotyped marble chimney-pieces to be in a great measure superseded, and the admirable way in which they have been used in connexion with wood has given an opportunity for design that will not readily be given up. Some excellent printed tiles have been made, well drawn and extremely moderate in price, and well adapted for chimney-pieces and wall linings. In connexion with chimney-pieces tile hearths may be mentioned as an improvement not only in appearance, but also on account of their cleanliness.

Much attention has been given of late to the design and manufacture of stoves. Instead of being limited to the two or three descriptions of the well-known register, we have now a large variety of stoves, all claiming advantages, either in economy, in heat, or in saving of coals. The wasteful way in which we Englishmen use coals is admitted on all hands, and when, a winter or two ago, the price of coals became so enormous as to produce almost a famine, the direction of stove manufacturers was naturally led to devise some plan for their more economical use. Without attempting to describe all or any of the improved stoves, they may be classed under three heads:—First, those that warm the air admitted from without and deliver it in an upper room or other portion of the house. Second, those that provide means for delivering the warmed air in one or more parts of the room in addition to the fireplace. Third,—Those that by polished surfaces reflect the heat, or by fire-clumps or other

substances retain the heat. All these descriptions make use of the ordinary open fire, and for the purpose of house-warming, as well as for comfort, it is not probable that this form will be speedily abandoned. At the same time, notwithstanding the improvements and the economy resulting from the use of the heated air at the back of the stove, which was formerly lost, a considerable portion passes up the chimney without being available for the purpose of the house, and there does not appear to be any means of remedying this, unless the smoke is again passed through the fire, as is the case with the smoke-consuming apparatus fitted to boiler furnaces. The introduction of air from the outside of the house to supply the stove is advocated, and doubtless for the comfort of the inmates it is better that the fire should be fed in this manner rather than by the air in the room; but I believe this plan increases, rather than diminishes, the quantity of coals consumed. The extended use of kitcheners is fast superseding the open fire-ranges, although the latter have advantages that will commend them to some people; but the conveniences possessed by the close ranges give great facilities for cooking in a small space. It is somewhat surprising that the independent cooking-ranges, such as are in almost universal use abroad, are so little adopted. Several kinds have lately been introduced to stand in a chimney-opening without any setting. The front and sides, as well as the top, are available for cooking purposes, and the cost is much less than the ordinary range, whilst the saving in fuel is considerable. Possibly, now that the culinary art is being taken up as an accomplishment for ladies, and as part of the higher class education for girls in Board-schools, we shall have corresponding improvements in kitchen-ranges.

We now pass on to the plumber, and in this trade probably more than any other have the inventors and patentees been hard at work. The recent regulations of the Board of Trade, requiring the Metropolitan Water Companies to furnish a constant instead of an intermittent water-supply within a certain number (I believe now about nine) years has occasioned an entire alteration in the system of water-fittings to houses. From the time the regulations were issued, all new buildings were to be furnished with pipes and fittings suitable for a constant supply, although for the time being the supply is continued as heretofore. The chief end gained will be, that instead of water being rendered impure by storage in a cistern, it will be drawn direct from the main, and except for a supply in case of emergency, cisterns may be altogether dispensed with. The service-pipes being always charged, must, of necessity, be very strong, and therefore the heaviest pipes that are made are used, although, where ¾-inch pipe was formerly used, ½-in. will now be sufficient. The ordinary bib-cocks are not suitable for high-pressure, because with a full way, the weight of water would be too great for convenient use. Screw-down high-pressure cocks are substituted; and although these prevent the force of water at once, they are open to many objections, chiefly from the slow process of turning the water on and off, which, in nine cases out of ten, to save trouble, is left running, and thus occasions a considerable waste. Possibly some day we shall have an improved high-pressure cock invented that will remedy these objections. Another great alteration is, that all closets must be fitted with a water-waste preventer, so called, or, in other words, a means of storing two gallons of water to discharge into the water-closet pan, without taking the supply direct from the cistern or main. There are so many water-waste preventers now in use that it is desirable to find what is generally used in the particular district, and to adopt it, as, so long as the water companies enjoy their monopoly, they can require any fitting they may please to be used, and refuse to lay on the water until it has been altered. In some of these preventers I believe it is imperative that two gallons of water should be discharged every time the closet is used. This in some cases is a waste of water, and in others not sufficient, especially as the flush is so feeble, by reason of the preventer being fixed so near the apparatus. The use of these preventers does away with the expense of a regulator-closet, which is an advantage, and the simpler and less complicated the water-closet apparatus the better for use.

Earth-closets have now been adopted for some years, and where the soil can be made use of in the garden or fields, they are advantageous. The chief objection to them—viz., the mixture of the liquid with the solid matter,—has been met by an improved arrangement to carry off the liquid by a pipe into a pit, where it is filtered, and runs into an overflow drain, or, what is better, is used for irrigation.

The increased use of baths has created work for plumbers, and the advantages of them in houses are very great. The waste-pipe, if not properly connected, is, however, often a source of evil to the inmates, and in all cases should be taken outside the wall, and turned into a cesspool or gully, so that no direct communication is made with the drain. The most expensive part of a bath is the supply of hot water, and this is accomplished by two or three methods, the simplest being by a gas-stove, or a batten of gas under the bath; but this is by no means an economical plan, as, although the first cost is comparatively trifling, the consumption of gas for this purpose soon amounts to the extra cost of providing a hot-water apparatus. Another plan is, to fix a stove, with boiler, in the bath-room, which is attended with extra trouble; but the plan most economical and easy of use is a wrought-iron boiler fixed at the back of the kitchen-range, and pipes laid to a hot-water cistern in the bath-room. Although the original cost of this plan is the greatest, its first expense is also its last, as the kitchen fire is utilised for heating the boiler.

When opportunity offers, a coil of hot-water pipes should be fixed in the hall or staircase, communicating with the flow-pipe, and the extra expense is very trifling. The advantage of heat in the staircase and passages is almost incalculable; the air entering the rooms, being warmed, produces an equable temperature over the whole house, and the chances of catching cold by coming directly out of a warm room into an air very little above the temperature of the external air is greatly reduced. It is a great convenience in every house to have a supply of soft water for washing; and even in London, where the atmosphere is much purer than formerly, I believe this is practicable. The expense in forming a water-proof tank underground, and laying special drains, has prevented the utilisation of rain-water in small houses, but if the greater part of the water from the roof were collected into a cistern inside the house, the cost would be very trifling.

The use of zinc as a roof-covering has lately become far more general than formerly, and when properly laid it has proved itself a useful material and is much cheaper than lead. The ready way in which it can be shaped, and the many uses to which it is capable of being applied, will doubtless greatly increase its demand.

A word or two on drains naturally follows the plumber's work, and on this subject I regret so little advance has been made towards perfection. The glazed earthenware socket-pipe is very well adapted to its purpose if care in the method of laying could be ensured, but the work is usually entrusted to a workman often little better than a labourer, with whom rests the responsibility of laying each pipe to a uniform fall—that the bottom of the trenches are not soft, that the pipes are carefully jointed all round (in nine cases out of ten neglected at the bottom, causing them to drop after they are laid), and that all connexions of soil and other pipes are securely made, and above all that the drains are properly trapped. All these things are most important, but their position makes it difficult to properly superintend them, and as they are very soon hidden out of sight after they are laid, everything depends on the care and integrity of the workman. A great deal of the complaint of bad smells arises in houses which are supposed to be properly drained, by their faulty laying and connexions, and naturally occasions dissatisfaction to all concerned. How to remedy this I know not, except by employing a responsible and independent person whose sole duty it is to do work of this kind, and in case of failure subject to a heavy fine. This is perhaps a novel idea, but as so much of health and possibly life is due to the perfectness of the drains some such plan is desirable, especially as the houses in which the least care is bestowed are often tenanted by persons to whom the want of it proves most fatal. Drains should be kept as far as possible out of the house, and no pipes except the soil-pipe connected with them (and I believe there is a plan whereby this may be prevented, but I do not know the details). All waste-pipes should be carried outside the house into a trapped gully. A ventilating-pipe should be connected with the soil-pipe, and carried well above the roof of the house and clear of all windows; and although this is not altogether effectual, it is a great easement to the drains.

The almost universal use of gas in houses requires special provision, and much of the outcry for increased ventilation arises from its use: so long as rooms were of a moderate height, and candles or oil were the only means of illumination, there was no urgent need for ventilation, but now that the temperature of rooms is so increased by reason of the gas, some method of getting rid of the superfluous heat as well as the impure air should be provided. If instead of the lights branching out from the chandelier they turned inwards from a ring under a kind of glass trumpet-mouth tube communicating with a ventilator, much benefit would arise. As this, however, would alter the style of gasfitting, there would doubtless be an objection to its use; failing this, a hopper in the depth of the floor over a perforated ceiling-flower, and a ventilating-pipe carried into the flue of the room above, produces a manifest improvement in the comfort of the room. Rickett's ventilating burner is a very good proof of my suggestion, as wherever it is used it gives great satisfaction. I dare not go further into the subject of ventilation, this being a topic sufficient for a special paper, which I trust some one will favour us with during the next session.

A great outcry was raised by some architects against the use of plate glass, and although it seriously affects a design, its advantages are so great that the public are not at all likely to dispense with its use, nor to be content with it in small squares, divided by very heavy sash bars. As a kind of compromise, plate glass is by some used in the lower portion of a window, and painted or tinted glass in ornamental designs in the upper. This arrangement has caused the subject of ornamental glazing to be taken up, and instead of the matted or embossed glass formerly universally used, a good effect is produced by glazing in tinted glass in ornamental patterns, or by slightly painting the glass in such a manner that its transparency is not lost.

A process has lately been invented to render glass non-fragile, and many things are promised by its use, but as the manufacture of toughened glass is in its infancy, very little has, I believe, yet been done of service to the house-builder.

The decorative treatment of iron has been well developed recently. Much of the wrought-iron work is really artistic, and the designs for cast iron are, as a rule, adapted to the material rather than as formerly producing in cast iron a design only fitted for wrought iron. Notwithstanding the favour in which graining has been held for a long time, public taste seems now to incline towards ornamental painting, and the effect produced by a room artistically decorated is very pleasing, and far less monotonous to the eye than the repetition of graining. The use of varnish gives the work painted in this way all the advantages that formerly only belonged to grained work.

Design in paper-hangings has lately shown great improvement; instead of patterns of leaves and flowers, and watered satins served up with a few alterations and different colours year by year, some of the best designers in our professien have turned their attention to the subject, and the appreciation of their designs is proved by the fact that old-fashioned patterns are fast giving place to the modern ones. One of the greatest improvements is the use of the dado and frieze as a means of decoration, and as a common-sense way of papering a living-room and staircase, and with ordinary care in the selection of colour, either in complement or contrast, the effect cannot be other than satisfactory. And now, Mr. President and gentlemen, I have worked through the several trades in house-building. I am aware there is much more that I might have brought forward, but I fear I have already tired you with so much detail; but, as I expressed at the commencement of the paper, my object was to elicit the opinion and experience of those present on the improvements in house-building generally. I now leave the matter in your hands, thanking you for the attention and patience with which you have been pleased to favour me.

A discussion ensued, to which we will return.

Artisans' Institute, Castle-street.—The annual meeting of this Institute will be held at the Mansion House, on Monday, the 29th inst., by permission of the Lord Mayor, who will take the chair at three p.m. There is to be a *soirée* at the Institute on Saturday, June 3rd.

NEW CIRCUS IN BRISTOL.

MR. JAMES NEWSOME has opened a circus in the newly-erected wooden building, Park-row, opposite the New Theatre Royal. This structure, which has only taken five weeks in erection, stands on a site belonging to Mr. Alderman Edwards. The architect is Mr. J. H. Hurst, and its design has been under his consideration for some time, but he has hitherto been unable to find an opportunity for carrying it into execution. The building has eight sides, and each of these goes direct from the top deep into the ground, thus giving a very solid foundation. From every one of the eight sides are transept-like projections, and the seating runs up them to the furthermost point, the consequence being no obstruction to those present having a complete view of the arena. Advantage is taken of this mode of construction to obtain stable accommodation for a large number of horses, dressing-rooms, and other conveniences. In the surplus height over the stables and seats there is left space for hay and straw, and a few extra dressing-rooms are contrived. The contractor is Mr. G. Keeley, of Blackburn, and the whole of the timber used has been supplied from the yard of Messrs. Jones & Nash, Canons'-marsh. Messrs. Legg & Company, Bromsgrove-street, Birmingham, are the decorators of the interior. The entrance-lobby from Park-row is 30 ft. long by 10 ft. wide and 15 ft. high. The lighting has been carried out by Mr. John Palmer, of the Promenade, Clifton, the gaselier in the centre having 3,000 glass drops; and there are Prince of Wales's plumes in gas jets at the sides. It is stated that about 3,000 spectators can be accommodated in this building.

FROM DUNDEE.

SOME offices recently erected for the firm of Don Brothers, Buist, & Co., merchants and manufacturers, are the most extensive of their kind in Dundee. They combine offices for the works of the firm and for commercial purposes. The latter are entered at a circular corner, and are approached by a spacious staircase leading to a vestibule, from which there are doors to the commercial office and to the rooms of Mr. John Don. Adjoining this is the mill office, and attached to it, Mr. Buist's rooms, with staircase giving access to the works. On the ground-floor are manager's and drawing offices, dining-rooms for the male and female workers, store-rooms, and mill lodge. The buildings have been heated by Messrs. Combe, of Glasgow, on the combined systems of hot water and hot air, and are ventilated in connexion with that arrangement. The entire works have been carried out from the designs and under the superintendence of Messrs. James Maclaren & George Shaw Aitken, architects, Dundee.

THE INHABITED HOUSE DUTY: "FLATS."

A CASE of some importance, calling in question a decision of the Court of Exchequer, to which we alluded some months ago, has just been heard in the Court of Appeal of the Supreme Court of Judicature. The facts are briefly as follow:—The respondents, the Mutual Tontine Westminster Association (Limited), possess several blocks of houses in Victoria-street, which are let in flats or suites to different tenants. A common door gives entrance to several of these suites, which are otherwise let apart as separate residences. The Crown contended that each suite should be assessed as a separate "house," for the purpose of the Inhabited House Duty; while the owners resisted the claim, on the ground that only each portion of the blocks having a separate street-entrance should be charged. The Court of Exchequer at the time decided in favour of the Association; but the Crown, by the Attorney-General, has carried the point to the Court of Appeal. The Court gave judgment to the effect that the buildings, and not the suites, should be assessed. The Court laid down that the rule of construction, to give the words in a document their ordinary signification, must be observed here, and the *onus* is cast on the party to show that they are used in another sense. The 6th rule of Schedule B, 48 Geo. III., c. 55, says that "when any house shall be let in different stories, tenements, lodgings, or landings, and shall be inhabited by two or more persons or families, the same shall nevertheless be subject to and shall in like manner be charged to the said duties as if such house or tenement was inhabited by one person or family only, and the landlord or owner shall be deemed the occupier of such dwelling-house and shall be charged to the said duties." This rule was held exactly to meet the present case. Internally the blocks consist of tenements; externally they are houses. The argument that in other Acts of Parliament these tenements are described to be houses was held to be inadmissible, as the present Act (48 Geo. III.) was the only one to be continued. Under these circumstances the Court affirmed the decision of the Court of Exchequer.

ALDERMAN THOMAS PROCTOR, OF BRISTOL.

BRISTOL has lost one of its worthiest sons, acute, far-seeing, wealthy, and good. Our readers have often seen his name. As the originator, in his earlier life, of the movement for preserving the Church of St. Mary Redcliff, then little better than a ruin, and for years the persistent supporter of the works under all difficulties, as the donor of a drinking-fountain on Clifton Downs, and more recently as having presented to Bristol a mansion for the occupation of the mayor for the time being, he has been often spoken of, and justly praised. Not long ago he converted, at his sole cost, the dusty highway of Coronation-road, by the New-cut, into a bright boulevard on the river side, accommodated with seats, and shaded with trees, the charming verdure of which is at this moment a most fitting monument of his kindly thoughtfulness. At Fishponds, where he had property, and where the young population abound, seeing the want of a playground for boys and girls, he provided a field and a covered shed for juvenile games, capable of affording shelter for 500 children. In these and many other good deeds of which less is known, Mr. Proctor had the earnest co-operation of an admirable wife. At the funeral, which took place on the 19th, the mayor and corporation, with large crowds of the citizens, were present, and we shall not be exaggerating if we say that respect for his character, and regret for his loss, are felt throughout the whole of Bristol, and beyond.

THE SEWAGE FARM AT CROYDON.

SIR,—It is stated in a paper read by Dr. Alfred Carpenter, of Croydon, at the Conference on the Health and Sewage of Towns, and published in your issue of the 13th of May, that the engineer of the Croydon Local Board, at the expiration of the lease of the Sewage Farm at Croydon, advised the Local Board to have no dealings with Mr. Marriage with reference to the Sewage Farm.

Will you allow me to state that I was the engineer of the Local Board at that time, and that the statement in question is entirely without foundation?

The assertion that the Croydon Irrigation and Farming Company commenced their works with a real capital of 1,500*l.* (nominal capital being 10,000*l.*), and that they borrowed money from their bankers, is equally incorrect. Upwards of 800 10*l.* shares were subscribed for in the company, the whole of which were, from time to time, fully paid up. Dr. Carpenter also states that "the lease had been so drawn" that "while they (the company) paid no valuation on going into the land," beyond fixtures and a few small matters left in the ground by Mr. Marriage, "when it ended they were to receive a valuation according to the custom of the country, and under that clause the arbitrators and umpire again saddled the Croydon ratepayers with an enormous sum as valuation; and in the payments for 1874 figures the sum of 5,238*l.* paid to the receivers of the Farming Company." I should state that every farthing of the valuation which was paid by the Local Board to Mr. Marriage and other tenants, when they left the farm, was repaid by the Farming Company, and the Farming Company did not go out under the terms of the lease, but under a special agreement entered into between the Local Board and the Company. The latter, instead of going out under the terms of the lease, were to be paid for their growing crops, and live and dead farming stock, and were muloted in a fine of 500*l.* on surrendering the lease. (This fine, by the way, figures as a profit on sewage farming in Dr. Carpenter's return.) The 5,238*l.* represented very much more than an ordinary farm valuation. In fact, it represented, at that time, the whole of the capital necessary to stock the farm.

In conclusion, I would add that, instead of receiving back a large proportion of the capital, every shareholder in the Farm Company lost 8*l.* out of every 10*l.* share; and during the three years the company held the sewage-farm at Croydon, they lost upwards of 6,000*l.* The state of the Sewage Farm, when given up by the company, was not in that "ruinous condition" described by Dr. Carpenter, if this expression applies to the absolute condition of the farm; if, however, it applies to the process of culture carried on, it would be a correct statement; but I cannot readily believe the latter, as Dr. Carpenter, acting as chairman of the present committee of management of the Sewage Farm, has insisted on continuing the same ruinous policy of culture to within a few months of the present time. It is no longer necessary to make out a case as to the advisability of the application of sewage to land, as this mode of dealing with sewage is now generally admitted to be the only satisfactory mode of getting an effluent of a high standard of purity, and therefore it is not necessary to put forth exaggerated statements as to profit or loss incurred in performing what is the absolute duty of the authorities of all towns who have to deal with sewage that needs to be thoroughly purified before being turned into the pure fresh-water courses of the country.

BALDWIN LATHAM, C.E.,
Mem. Inst. C.E., &c.

JARRAH.

SIR,—Your issue of the 4th December, 1875, contains an article on the destruction of timber used in the construction of jetties, wharfs, piers, and other marine works, by the "teredo," and other insects; also a description of the various processes adopted by several firms for the purpose of forcing certain chemicals into the fibres of the wood to enable it to resist the attack of these insects.

I therefore desire to draw your attention to "jarrah"; a timber that possesses, naturally, the power of resisting the attacks of insects of all kinds, which has been proved by use for a period of forty years where the "teredo" abounds; and also by analysis made by Professor Abel, who reported "that from analysis he found the wood contained a pungent acid which he designated 'Jarrah Tannic Acid,' and which is destructive to insect life, the tannin at the same time preserving the timber from decay."

A printed report as to the qualities of "Western Australian Jarrah," compiled and published by the Government of that colony, shows that the officers of the Public Works Department of that colony have removed round piles, after being thirty-five years in use, from localities swarming with teredo, and found them perfectly sound. Also that ships which have been running for sixteen and twenty years, not coppered, were perfectly sound and free from the attacks of insects. Also copy of report of a select committee of the Legislative Council of the Colony of South Australia, on the "Port Bridge," the piles of which are "jarrah," the struts and braces of other timber; these, in the language of the report, "were found to be riddled with the 'teredo' and other marine insects, the iron rusted away, while the 'jarrah' piles remained unscathed and as sound as on the day they were driven."

This company has erected large saw-mills at Geographe Bay, Western Australia; also laid down a railway there to the Darling Ranges, on which the true "jarrah" grows, and are able to supply the timber in any quantity.

JOHN DITCHBURN,
Manager Western Australian Timber Co. (Limit.),
Ballarat, Victoria, Australia.

The New Waterworks at Warrenpoint (Ireland).—The Warrenpoint waterworks were formally opened on the 22nd ult., when Mr. Barton, C.E., presented a drinking-fountain to the inhabitants. The reservoir, which covers nearly seven acres in extent, is capable of containing three months' supply for a population of about 5,000. It is situated about a mile outside the town, on the north side, and is fully 120 ft. above the level of the town, so that the pressure is sufficient to drive the water over the highest house in town. The works will cost 5,000*l.* Mr. Bower, C.E., was the engineer. Messrs. Mahon & M'Murray, Newry, had the contract for making the reservoir.

"ACADEMY NOTES."

SIR,—A shilling pamphlet, under the above title, which is undergoing apparently a considerable sale at railway bookstalls, and an annual recurrence of which is threatened, appears to be, however well intended, very far short of its professions, and, in fact, a pernicious and delusive shilling's-worth. The publication includes some very commonplace remarks on some of the leading pictures, garnished with minute and scratchy illustrations purporting to show their subject and character. Some of these are from sketches furnished by the artists themselves, who are hardly consulting their own interests or their own artistic dignity in lending their names to this kind of travesty of their works. The critical notions of the writer may be gauged by the fact that he characterises Mr. Macbeth's picture of "A Lincolnshire Gang" as "a fit companion in sentiment to Mason's Harvest Moon," and, further, as "earnest work in the style of the late F. Walker." If Mr. Blackburn had, as one may suppose, a grudge against the painter of "The Lincolnshire Gang," it was scarcely Christian or charitable to carry it as far as this. There is more of the same sort. If this kind of publication really gratifies the British public, it is a new and painful indication of the mental attitude of that entity, in regard to art. The work is "published by special permission,"—of the Council of the Royal Academy, I presume. As Meg Merrilies said of the laird, "We wussed them ill, but no sic a doonfa' as that." The idea of an illustrated memorandum of the annual exhibitions is not a bad one in itself; but, if done at all, it ought to be done much better than this. S.

OWNERSHIP OF ARCHITECTS' DRAWINGS.

THE present may perhaps be considered an opportune moment to remind members of the architectural profession of a very simple method of retaining the ownership of their drawings. On every drawing that leaves the office there should be affixed a printed notice (just above where the principal intends to sign his name) to this effect:—"This drawing is my property, and must be returned to me before I sign the final certificate." The case mentioned in your number for the 13th inst. would seem to make it safer to substitute the words "on demand" for the last clause. Although I often have a serious fight with my clients as to ownership, I have my own way in the matter, because I make it a condition preceding the execution of the work. AUGUSTUS FRERE.

UTILISATION OF THE TIDE.

SIR,—As an old subscriber, on whose bookshelves stand twenty volumes of the *Builder*, I take the liberty of making a few observations on the article "Utilising the Tide," written by your contributor "D. B." in last Saturday's issue, who evidently is of opinion that he is the pioneer in this gigantic attempt at utilisation. I perfectly agree with "D. B." that the power of the tide is immense, its rise at Bristol dock-gates being 20·2 to 31·5 ft.; but that his method of treatment is the proper one, I think we can satisfactorily show is not the case, as at the termination of his article he says, "Now, by this method we utilise only one-eighth of the tide's force for any given area, for we gather into the upper reservoir only one-fourth of the water raised," &c. On February 2nd, 1875, I took out provisional protection, and on July 22nd, 1875, completed the patent of an invention for obtaining motive power from the action of the tide. The mode of action, as far as embankments, river-walls, and reservoirs are concerned, is precisely that described by "D. B.," save and except I place a water-wheel in the sluice or passage between the river and the reservoir, no more than one reservoir being required for each wheel, which said wheel is made to float on two air-tight cylinders placed in the embankment or river-wall, and consequently rises and falls with the tide, works both ways, as long as there is any motion in the water in or out of the reservoir; is easily geared or floated perfectly clear; has always the same grip of the water, and the gates can be closed in case of repairs.

JNO. F. WILKINSON.

*** Mr. B. Carr refers to a model for effecting the same purpose exhibited by him at the Workmen's Exhibition in Islington, 1873. Our own pages contain several propositions of the kind.

BRITTANY AND BRITAIN.

A LECTURE on the subject of the parallel antiquities of the two sections of Bretagne, was delivered at the rooms of the Institute of Architects, on the 17th inst., by Dr. Phené, before the British Archæological Association.

The lecturer drew, from a large number of sources in the more ancient Greek literature, statements which, while they have always been admitted as historical data, have never been carefully applied to the subject of archæology, still less to the archæology of Britain. Viewed with the light thus thrown on the subject, by quotations from Herodotus, Pausanias, Strabo, Diodorus Siculus, Hesychius, and others, the connexion of Phœnicia, not only with the British Islands, or Cassiterides, but more particularly with the geographical district now known as Brittany, became, he maintained, very prominent, and was supported by the peculiarity in the special class of stone monuments which marked the early settlers on the Gaulish coast, and which concentrated in Brittany, being only slightly exhibited in Britain. The highway from the grand seat of civilisation of the West, Massilia (Marseilles) up to Dariorigum (Vannes) was defined by these and other special evidences, consisting of devices on terra cotta and on incised stones, illustrated in the *Builder* of May 13, 1876, but more particularly by human features on stone celts, which are found along that route in particular, and which by their marked Nubian features, further supported the lecturer's suggestion that a tribe of nomades, which he identified with the Basque people, had come through Nubia to Libya, and crossed to the coasts of Spain and Gaul; and while they had not amalgamated with their Gallic neighbours, had aided their stone constructions by introducing a semi-Egyptian style, and instructing in the movement and erection of the immense stones still abounding in Armorica. That these stones were worshipped with Egyptian worship he thought clear from a special censure of this act by a council of the Church at Tours in the sixth century. They appeared to have succeeded ruder and earlier monolithic Pharoi, and the lecturer considered they had been erected when, after the destruction of Carthage, the Phœnician traffic was transferred to the Veneti, an ancient Phœnician colony. The Dracontium, of Karnac, which the lecturer considered was erected by these people, was identified with the Karneia, a festival in honour of Apollo, who, it is asserted, derived his title of Karneios from the Keltic people. During this festival the people of the north of Africa, and the Greeks, lived in tents; the festival was propitiatory, to avert pestilence. All this was still kept up at Karnac, the festival of St. Kornély, the modern Karneios, being held within a few days of the old Africo-Greek festival; during which the people live in tents, as the Spartans did, and the festival is held specially to avert pestilence from cattle, the cattle being led in procession through the town several times, and blessed by the bishop. These people appeared, from the evidence, to have effected a combination in matters of traffic and commerce with the Phœnicians, and to have been the carriers of Phœnician maritime traffic overland, after it was brought from Britain to the coast of Gaul.

Religious customs and sacrificial ceremonies were traced along the same route, and shown to be identical with those practised in Carthage, and afterwards in Gaul and Britain.

The Drainage of Ayr.—Sir John Hawkshaw has delivered his report on the drainage of Ayr. He proposes that a pipe should be laid along the beach from the southern limit of the burgh, intercepting all the present outfalls from that direction, leading from opposite the Barracks to Harbour-street, and thence to a point about 130 yards below the New Bridge, where it is proposed it should cross the river. The main sewage pipe for the northern part of the burgh is proposed to be laid from the end of the Old Bridge, where it will receive the sewage of Wallacetown; thence along River-street and Darlington-road, at which latter place it will receive the sewage from the southern part of the burgh; then along the North Quay as far as to York-street; and, following the line of York-street, the entire sewage of the burgh will be discharged by a circular pipe 4 ft. in diameter, at a distance of about 500 yards below the new dock works, by an outfall on the fore-shore near low-water mark. Sir John estimates the total cost of the works at 20,000*l.*

RICHMOND NEW WATERWORKS.

TURNING THE FIRST SOD.

ON Monday, the 15th inst., at eleven a.m., the officials from her Majesty's Office of Works attended by appointment in Richmond Park to meet the engineers (Messrs. Russ & Minns) and the contractor (Mr. Bugbird); and the site of the intended reservoir having been duly staked out, the "first sod" was turned by her Majesty's representative, and possession of the ground given to the contractor, whose men at once set to work, and already the spot shows unmistakable signs that "the works have begun." Workmen may also be seen at the late "Old Brewery Premises" in Water-lane (purchased by the vestry as the site for the artesian well) preparing the building and ground for the well-sinkers (Messrs. Baker & Sons), and it is understood "advices have been received" that the first freight of 14-in. pipes is about to leave the foundry of Messrs. Hopkins, Gilkes, & Co., at Middlesbrough.

COMPETITIONS.

St. Mary Abbotts, Kensington, New Board-room for Guardians.—In this competition, Mr. A. Williams, Messrs. Harston, and Messrs. Edward Power & Wheeler were invited to compete, and the guardians selected the design submitted by Messrs. Power & Wheeler, at an estimated cost of 1,400*l.*

St. Andrew's Presbyterian Church, Upper Norwood.—Mr. Barker, Mr. Alexander, Messrs. Edward Power & Wheeler, and Mr. C. Bell, were invited by the Building Committee to submit designs for this church, together with lecture-room, &c. The designs submitted by "Presbyter" were selected, the authors being Messrs. Power & Wheeler. The estimated cost is 6,180*l.*

Northampton Board Schools.—Twenty-three sets of plans were submitted in competition for the new schools proposed to be erected by the Northampton School Board on the Kettering-road. Mr. T. Roger Smith, who was requested by the Board to act as professional referee, has presented his report, which concludes as follows:—"I beg to recommend 'Justitia' as, in my opinion, the best design; 'Utility' (No. 2), as the second best design; 'Institutio' as the third; and 'Caretaker' is, in my opinion, equal with 'Institutio.'"

Leeds Model Lodging-houses.—The *Yorkshire Post* states that in the competition for these model lodging-houses the premiums have been awarded to the following architects:—Messrs. Perkin & Son, Leeds, first premium; and Mr. C. D. Swale, Leeds, and Mr. Leek, Hunslet, divided the second and third premiums, their designs being considered of equal merit.

Kidderminster New Cemetery.—At a meeting of the Kidderminster Burial Board, on the 15th inst., the principal business was the examination and selection of architects' plans for the erection of chapel, lodges, fences, entrance-gates, and the laying out of the ground purchased by the Board for elementary purposes. The clerk said he had received eighteen applications for "instructions to architects," but there were only three competing architects. The chairman then proceeded to read the architects' descriptions of the plans. Mr. J. Jackson, of Bradford, only competed for the chapel and lodge, which he estimated would cost 2,000*l.*; 1,500*l.* for the chapel, and 500*l.* for the lodge. As this did not comply with the terms of the advertisement, the plans were placed on one side without much examination. Messrs. Baker & Mayne, architects, of Church-street, Kidderminster, presented five drawings of the proposed erections. Their estimated expenses were for laying out the grounds, including the erection of an iron bridge, 108 ft. long and 30 ft. wide, calculated to carry twenty tons, with drainage of the land, 1,300*l.* The cost of entrance-gates, boundary fences, &c., 2,000*l.* They presented an alternative plan of the fences, viz., plain wrought-iron railings, which would cost 1,250*l.*, instead of 2,000*l.* The cost of erecting the chapel and lodge would be 2,000*l.* An architect, who signed himself "Golgotha," and proved to be Mr. Meredith, of the Bank-buildings, Kidderminster, presented five plans. The estimated cost of erecting the chapel and lodge according to his plans would be 1,500*l.* The laying out of the grounds, draining the same, forming roads, &c., would be 2,400*l.*; and for the erection of walls fences, with four entrance-gates, he estimated the cost would be 2,200*l.*, so far as the buildings were concerned, but the grounds were not so picturesquely laid out as in the designs

submitted by Messrs. Baker & Mayne. A long discussion took place, and after a sitting of nearly three hours, the plans prepared by Mr. Meredith were accepted.

Grimsby and District Hospital.—The Committee of the Grimsby and District Hospital have selected the plans for this building sent in by Messrs. Smith & Brodrick, architects, of Hull, and the tender of Messrs. Logan & Hemingway, contractors, of Grimsby, which accompanied the plans, has been also accepted. The works are to be proceeded with at once.

Huyton Sewerage.—At the first meeting for the year of the Huyton Parochial Authority, a principal item of business was the consideration of the question of appointing the engineer, and fixing on the plan—out of sixteen which had been received—for the intended sewerage and sewage disposal scheme. The one which had been awarded the first prize, 100*l.*, appeared to meet with the most general approval, and a deputation was appointed to wait upon Mr. Beesley, one of the members of the firm of Gotto & Beesley, of Westminster, who are the authors of the plan, before deciding the matter. The estimated cost of this scheme is 5,680*l.*, including three acres of land.

Horton Park, Bradford.—The *Bradford Observer* of the 18th inst. states that the offer by the Recreation Grounds Committee of the Bradford Town Council of two premiums of 100 guineas and 50 guineas respectively for the first and second best designs for the laying out of Horton Park brought into the field twenty-eight competitors, and, after careful consideration, the committee decided to recommend to the Council the design bearing the motto "Toujours prêt" as being deserving of the first premium, and that with the motto "Italian" as having earned the second. It is generally understood (says the *Observer*) that Mr. William Gay, landscape-gardener, of Bradford, is the author of the first design. The set of drawings which has been awarded the second prize, marked "Italian," has for its special feature a circular promenade, which surrounds the sheet of water in the middle of the park. The total estimated cost of this scheme is put down at 12,911*l.* The name of the author has not transpired.

Derby New Free Library.—A special meeting of the Derby Town Council was held on the 17th inst. for the purpose of examining the two designs selected by the Free Library Committee from amongst those sent in in competition. The chairman of the Free Library Committee moved that the proceedings of that committee in awarding the first premium of 60*l.* to Mr. R. K. Freeman, of Bolton, and the second premium of 30*l.* to Mr. C. J. Maycock, of Manchester, be approved. A desire had been expressed on the part of several members of the committee to award a third prize to a very meritorious design; but as this did not come within the scope of the advertisement issued by the committee, he did not think he should be justified in submitting such a proposal to the council. The motion was carried, after considerable discussion, in the course of which Mr. Alderman Clarke said he thought it was a positive injustice to those architects who had kept their plans anything near to the sum of 5,000*l.* mentioned in the committee's advertisement that the first premium should be awarded to a plan which he was credibly informed could not be carried out for less than 10,000*l.* Mr. Stenson said that having twice gone through the various sets of designs sent in by competing architects, he believed those selected by the committee to be of a very practical and useful nature. The estimate for carrying them out, he believed, was 7,300*l.*, and looking at the present price of materials and labour, he thought they might safely put the total cost, including fittings, &c., at 11,000*l.* or 12,000*l.* [Laughter, and a voice, "Don't be extravagant."] Well, say 10,000*l.* He hoped the committee would see the desirability of keeping the cost of the building within the 8,000*l.* offered by Mr. Bass for the erection of the building. The Chairman of the Free Library Committee, in reply, said the committee had determined not to carry out Mr. Freeman's plans in their entirety, unless it was found that the builders' estimates for carrying them out came within the amount given by Mr. Bass. It was perfectly true, as suggested by Mr. Alderman Clarke, that some few of the designs sent in were accompanied by the assurance that they could be carried out for something like 5,000*l.*; but not one of these possessed the very eminent qualification insisted upon by the committee in their instructions, that there should be a sufficient supervision over the two buildings,—the Free Library and Museum,—without largely increasing the working staff of the institution. If architects who had sent in plans approximating in their probable cost to the sum of 5,000*l.* mentioned in the advertisement had failed to comply with other requirements insisted on by the committee, they could not complain if a preference had been given to plans which did meet those requirements.

NEW MASONIC HALL AT GALASHIELS.

THE foundation-stone was laid on the 12th inst. The scheme having been in its more recent progress taken up by the R.W.M., Brother A. Thomson, reached a few months ago a stage which warranted the procuring of building plans from Messrs. Hall & Murray, Galashiels. These plans, which are now being put into execution on a site at the corner of Templar-terrace and the new street which it is intended shall run through part of Gala Park, are of a character that will, besides admitting of the erection of a thoroughly suitable hall, enable the Masonic brethren to provide themselves with this luxury at a very little real expense. With an object of this kind in view, the architects have designed a commodious block of buildings, containing, in addition to the requisite lodge accommodation, so placed as not materially to add to the expense of the whole, workmen's dwelling-houses sufficient for ten families, with shop premises on the ground-floor. Externally the elevation, showing in style an adaptation of the Scottish baronial, is two stories in height, with a large attic-flat, and in its east and north fronts (which measure in length respectively 65 ft. and 72 ft.) has somewhat of a pronounced character. The total cost of the work about the tower is estimated at 3,000*l.*

BECKENHAM, KENT.

CHRIST CHURCH, Beckenham, which will accommodate 750 persons, was consecrated by the Archbishop of Canterbury on Saturday last. It has a nave 30 ft. in clear span, each aisle being 12 ft. wide, and the distance from centre to centre of the arcade columns is 17 ft. The chancel is 24 ft. wide. There is a vestry on the north side, and an organ-chamber on the south side; a north porch, and a south-western tower and spire (approaching completion), 117 ft. 6 in. high, serving as a second entrance, while a west doorway is provided as an additional exit. The walls are faced with white Suffolk bricks, with bands of seconds Malms sparingly used. Bath stone is chiefly used for the masonry, but the nave piers are monoliths of polished dark shap granite. The roofs are slated, and the floors laid with Maw's tiles by Messrs. W. B. Simpson & Sons. The heating apparatus of hot-water pipes in trenches is by Messrs. Herring & Sons, of Chertsey. The carving to the capitals, and the pulpit and font, are by Messrs. Farmer & Brindley. The contractors are Messrs. E. B. Gammon & Sons, of Lambeth; and the works have been carried out from the designs and under the superintendence of Messrs. Blashill & Haywood, of Old Jewry-chambers, at a cost of about 6,500*l.*

SURVEYORSHIP ITEMS.

Warwick.—At the meeting of the Warwick Town Council, on the 9th inst., it was stated that there were fifty-one applications for the office of surveyor, exactly the same number as on the occasion of the appointment in May, 1870, of Mr. Pritchard, who has just resigned. The following are the selected candidates, from amongst whom the final selection will be made:—Mr. G. Lewis, Saint Pancras; Mr. E. Frost, Hanley; Mr. R. Richardson, Cleator Moor; Mr. J. Eayres, Llanelly; and Mr. R. H. Inch, Croydon.

Newport (Isle of Wight).—The Committee of Highway Commissioners appointed to consider the applications and testimonials of the candidates for the vacant surveyorship of the East Medene, met at the Guildhall, Newport, on the 17th inst. There were seventy-one applicants, and the names of six selected by the committee will be submitted to a general meeting of the Highway Board.

Merthyr Tydvil.—Mr. H. Williams has been appointed assistant-surveyor to the Merthyr Tydvil Urban Sanitary Authority.

Ossett-cum-Gawthorpe.—Mr. J. H. Duckinfield has been appointed surveyor and inspector of nuisances to the Ossett-cum-Gawthorpe Urban Sanitary Authority, *vice* Exley, resigned.

THE NEW STREET AT CHARING CROSS.

SIR,—Will you allow me to invite your attention to what seems to me a serious public injury proposed to be perpetrated by the Metropolitan Board of Works in connexion with their new street at Charing-cross. At a cost of something between half and three-quarters of a million they are carrying out an important public work, and yet as a result it will (unless prevented) be accomplished at the cost of a serious and irremediable public inconvenience. I allude to the narrowing of the footway on the northern frontage facing Trafalgar-square.

Architecturally, a wide and handsome footway is desirable, but for the convenience of the crowded traffic it is essential. Yet, although taking credit to themselves for two footways 15 ft. in width to Northumberland-avenue, when they deal with the far more important and thronged frontage towards the square they propose to reduce that, and have set it out so that at one point it will be actually under 10 ft. in width. If you walk round that way you will see, and yet hardly credit what you see. It must be borne in mind that the line of the existing palings is stated to be 3 ft. in front of the actual building frontage.

Z.

THE GREAT DOLWILYM CROMLECH.

THIS beautiful prehistoric structure, illustrated in last week's *Builder*, is not now for the first time made known to the public. An engraving of it which may be pronounced quite accurate, as being a facsimile of a good photograph, was published in 1872, in Dr. Nicholas's "Annals and Antiquities of Wales" (vol. i., p. 222), and this was the first notice taken of this interesting relic, as far as known, in modern literature. The photograph was supplied by Miss Protheroe, of Dolwilym, and by her request engraved for the work. The Cambrian Archæological Association has at last found out the cromlech, and produced a sketch of it, which must be admitted to be original, if not "positively exact."

T. N.

VICTORIA HOSPITAL FOR SICK CHILDREN, QUEEN'S-ROAD, CHELSEA.

ON the 20th inst. the Princess Louise of Lorne re-opened this hospital, after the execution of various works and additions, which include the entire re-arrangement of the interior to form four large wards, and one separation ward; new wings, in which are placed bath-rooms, ward sculleries, and so forth; new stone staircase; and an improved west elevation. Each of the large wards will accommodate fifteen beds. Those on the ground-floor are 15 ft. high; those on first floor are 11 ft. 6 in. high (being 1 ft. higher than formerly).

The new works have cost about 3,000*l.*, and have been executed by Mr. Walter Nash, of Newland's-terrace, Kensington. The architect is Mr. John J. Thomson, of Durham-place, Chelsea.

VEGETATION IN CEMENT WORK.

SIR,—I should feel greatly obliged to any of your readers who would favour me with an opinion as to the cause of, and suggest a remedy for, a remarkable and persistent oozing through painted cement work of a species of vegetation or fungi. The cement is on the outside of a country-house situate in a park, and with trees within 30 ft. or 40 ft. The spots appear at first from 2 in. to 3 in. in diameter, and of a light greyish colour; as they enlarge they deepen in colour, and form a large mass by meeting, and it then has the appearance of a very fine moss. Repeated coats of paint fail to kill it, as after three or four months it shows again; there are some small pieces of cement here and there it will not touch.

W. W.

DAMAGES RECOVERABLE BY WORKMEN FOR PERSONAL INJURIES.

HOOD *v.* BROWN.

THIS case (heard in the Common Pleas Division of the High Court of Judicature on Monday last, the 22nd inst., before Mr. Justice Lindley and a special jury) was an action to recover damages for serious personal injuries.

The plaintiff, a young man, was a working plumber, and the defendant was a contractor who had undertaken to do a good deal of work at the brewery of Messrs. Reid & Co., in Liquorpond-street. On November 19th, the plaintiff was employed there, under a Mr. Smeaton, to do some

Plumbing work, when a plank gave way under him, and he fell a distance of something like 50 ft. He broke his right leg. He was still suffering from the injury, and it was said that even if he got better the limb must be permanently shortened.

The case for the plaintiff was that the plank was unsound, and the scaffold not properly constructed; but, on the other hand, it was said that the materials of which the scaffold was constructed were exceptionally good, and that the structure was properly built. It was added that the plank broke in consequence of the plaintiff having dropped from a height upon it, a thing which he ought by no means to have done. There were also some points of law raised for the defendant.

After a very long trial a settlement was arrived at. It was agreed that a juror should be withdrawn, and that the plaintiff should be paid 100*l.*, in addition to a sum for costs.

CASE UNDER THE METROPOLITAN BUILDING ACT.

WOODEN BUILDINGS.

AT the Hampstead Police-court, on the 9th inst., Mr. William Harman, builder, of St. John's Wood, appeared to answer a summons taken out by Mr. H. E. Kendall, district surveyor of Hampstead, charging him with neglecting to comply with a notice from Mr. Kendall, dated the 24th of April, with respect to a wooden building erected in Willow-road, Lower-heath, contrary to the provisions of the Metropolitan Building Acts.

It appeared that defendant was the builder of a wooden shed on a piece of garden ground in the Willow-road, beyond the general line of frontage. The shed was for use as a refreshment-stall. A few days before Easter Mr. Kendall, in his rounds, observed this building, which he considered objectionable, as it was of wood, and not of stone or brick and incombustible material. Further than that, it being beyond the general line of frontage, Mr. Kendall could not have sanctioned it, even had it been of proper material. Direct application to the Metropolitan Board of Works would have been necessary. Mr. Kendall spoke to defendant about it, but, on the latter promising that if he allowed it to remain two or three days, so as to be available for the Easter holidays, he would then pull it down, Mr. Kendall consented. However, some days afterwards defendant, accompanied by Mr. Warrington, by whom he was employed, went to Mr. Kendall's Hampstead office, and, in his absence, induced the housekeeper to receive and give a receipt for 15s. as "surveyor's fee for the erection of a wooden building in Willow-road," defendant, or the gentleman with him, only at that time filling up the form of application for consent. Mr. Kendall, even had he given his consent, would not have been entitled to this fee until a month after the building was roofed in, and, on hearing what had been done, he immediately sent the money back, with a letter and a formal notice to pull down the building. Defendant returned the money and the notice, accompanied by an impudent letter.

Defendant on oath denied receiving that notice, but the evidence appeared conclusive on the point.

The Bench ordered the defendant to take down the building within forty-eight hours, and to pay full costs.

SYPHON TRAPS.

SIR,—Your correspondent, "Arthur Loader," is quite correct when he says that syphon traps frequently do not act as traps. I have long been convinced of this, and for years have discarded them altogether. Even where the dip is sufficient they have so many disadvantages, that a drain is better without them than with them. They choke with dirt, are difficult to get at, check the current, and are in every way unsatisfactory. The gully-trap is the best for all purposes, but there are so many of these that are not what they profess to be that some four or five years ago I designed one for our own use, which has given us every satisfaction. F. SMITH.

MEMORIAL TABLETS IN LONDON.

TABLETS have been set up, by the care of the Society of Arts, during the past month, on houses formerly lived in by the following distinguished men:—

Samuel Johnson—17, Gough-square, Fleet-street.

Edmund Burke, 37, Gerrard-street, Soho.

George Canning—37, Conduit-street.

Michael Faraday—2, Blandford-street, Portman-square.

David Garrick—5, Adelphi-terrace.

Horatio Nelson—147, New Bond-street.

Mrs. Siddons—27, Upper Baker-street.

The following is a list of tablets previously erected:—

John Dryden—43, Gerrard-street, Soho.

John Flaxman—7, Buckingham-street, Fitzroy-square.

George Handel—25, Brook-street.

Benjamin Franklin—7, Craven-street.

Sir Joshua Reynolds—47, Leicester-square.

Lord Byron—16, Holles-street, Cavendish-square.

Napoleon III.—3a, King-street, St. James's.

The Civil Engineers' Conversazione, on Thursday, the 1st of June, is to take place in the South Kensington Museum itself, instead of, as at first intended, in the galleries devoted to the scientific apparatus exhibition.

Miscellanea.

Discovery of Wall-Paintings at Baunton Church.—During the restoration of the little church at Baunton, which is now being carried out at the cost of Mr. T. W. C. Master, of Cirencester, a number of wall paintings have been uncovered by the careful removal of the coating of whitewash, and the utmost pains are said to have been taken by those employed to preserve every bit of colour wherever found. Among the pictures disclosed to view is a large and interesting painting, in a panel on the north wall, of St. Christopher, to whom the church is dedicated. The child and the ball are obliterated, but the gilt cross remains, with the gilding upon it, in very good preservation. The river is full of fish, and a figure on the opposite bank is engaged in fishing, apparently with satisfactory results, seeing he has got two on his lines, and a good basket beside him. The back-ground on the left is a hilly landscape, with groves of palm. The outline of the hills is well defined, and many towers, pinnacles, and steeples rise above the hill tops. On the right is some ecclesiastical building, and many boats are seen on the river. There is an inscription on the upper margin of the panel in black letter, with red capitals. Over the chancel arch, which is small, semi-circular, and almost destitute of ornament or mouldings, is the figure of the Saviour led to execution by two Roman soldiers. The Saviour carries the cross, and a rope is round His waist, with one soldier in front and one behind urging Him forward. The nimbus is clearly seen, and the roadway plainly marked, with lines undulating. Over the right-hand it is so much destroyed, that at present nothing can be seen to make out its intent.

Canterbury Cathedral.—At a meeting held at Lambeth Palace on the 5th inst., under the presidency of the Archbishop of Canterbury, the Dean referred to the steps which had been taken by his predecessors to keep the cathedral in a proper state of repair, and called upon Sir Gilbert Scott to state the result of his explorations, and his suggestions for the restoration. Sir G. Scott at some length entered into the result of his examination, and stated his proposal was to bring matters back as nearly as possible to the state they were in at the time of Prior de Estria in 1304, and to remove the Renaissance stalls, not for the purpose of showing sham architecture, but to expose the beautiful work of the fourteenth century, which they now concealed. Mr. Beresford Hope moved,—"That this meeting, having heard Sir Gilbert Scott's explanations and plans for the refitting of the choir of Canterbury Cathedral, undertakes to co-operate with the Dean and Chapter to raise the necessary funds." Mr. Butler-Johnstone, M.P., seconded the motion, and suggested that it would be undignified to commence the restoration until a substantial portion of the 16,000*l.* required had been obtained. The Dean stated that the amount promised towards the restoration is 3,000*l.*

Obituary.—The death is announced of Mr. James May, C.E., a native of Clacnaharry, near Inverness. After being trained with the Messrs. Gibb, of Aberdeen, Mr. May was connected with the Aberdeen Railway, and also the Edinburgh and Glasgow. He was engaged for twenty years at the Alderney Harbour works, and subsequently two years at the Alexandra Harbour extension. The deceased sailed twelve months ago for Madras, having received an appointment from the Indian Government to superintend the important harbour works intended to be carried out on that exposed and hazardous coast. He had only entered upon his new duty, and was engaged in making the necessary preparations, when he was attacked by fever, and was carried off at the comparatively early age of fifty-seven.——Mr. William Butcher, a well-known land surveyor and auctioneer, died at Norwich on the 19th inst., in his 82nd year.——The death is announced of Mr. Benjamin Burleigh, C.E., the architect to the North-Eastern Railway Company, which took place on the 25th ult. The deceased gentleman, who, at the time of his death was in his fifty-sixth year, had only been in the service of the company about three years, having succeeded Mr. Prosser.

Ventilation.—We have received a long communication from Mr. Tobin; but as it replies to statements not made in our pages, and does not reply to those that have been made there, we cannot afford space for it.

Compensation to Workmen for Accidents. At the monthly meeting of the Birmingham Trades Council, on the 3rd inst., a petition to Parliament in favour of the Compensation to Workmen's Bill was unanimously adopted, on the proposition of Mr. Skelton:—"That numerous accidents annually occur, causing death or injury to the person, through defective machinery, with other appliances used in trade, or through some default of persons in the same employment other than the person or persons injured, and without any default or neglect on their own part. That the person or persons so injured through no neglect or default of their own have, by the existing interpretation of the law, been unable to recover damages for the injuries received, or their family compensated in case of death. We therefore pray your honourable House to pass this session the Bill to amend the law relating to the liability of employers for injuries negligently caused by persons in their employment now before your honourable House."

The Iron Trade and the Foreign Office.—It was recently announced that in order to meet the arguments of those foreign iron producers who are agitating for protective duties upon the English iron as a necessity of their trade, the British Government had directed inquiries to be made as to the actual condition of the English iron trade in its various manufacturing centres. The Foreign Office inquiries have been addressed to the various iron-making firms in South Staffordshire, but out of 104 manufacturers of wrought-iron in this district only 39 firms have been at the trouble to reply. Unless the makers of wrought-iron respond more readily, it is to be feared that part of the information asked for cannot be furnished in time for Government purposes. As the inquiry is undertaken solely in the interests of English iron manufacturers, it is to be hoped they will see the desirability of sending in their replies without further delay.

"Garraway's."—The Exchange Tavern and Dining-rooms, No. 2, Change-alley, Cornhill, so well known for two hundred years as "Garraway's Coffee House," and until a few years ago a noted place for the sale of houses, land, &c., was offered for sale by public auction, at the Auction Mart, on the 3rd inst., by Messrs. Edwin Fox & Bousfield. The property comprised the freehold premises in which the business of the tavern is carried on, containing an area of about 1,042 superficial feet. The fixtures, trade fittings, and utensils of trade to be taken by the purchaser at a valuation. The auctioneer estimated the annual value of the property in the event of the trade fittings, &c., being taken out, and 500*l.* expended on improving the property and adapting it to a public company, at 1,500*l.* per annum. The biddings went up to 23,500*l.*, on which the property was bought in at 25,000*l.*

Lighting Reform at Winchester.—At the last meeting of the Winchester Town Council, the Mayor moved "that the General Purposes Committee be authorised to accept the offer of Messrs. Bayley & Co., of Poole, to light the street-lamps at a cost of 3*l.* 5*s.* per lamp. Mr. Warren urged that the contract should provide for lighting the lamps every night, the offer being that the lamps should be burnt ten hours per night, except four nights at the full moon, by reducing the time to nine hours and a half. The Council would have saved 210*l.* last year at the rate now proposed. After remarks from Alderman Forder, who thought the Town hall and other public buildings should be lighted upon the new principle, the motion was unanimously adopted.

The Directors of the London, Brighton, and South Coast Railway Company have accepted the tender of Mr. Joseph Firbank, of Newport, Monmouthshire, for the new line from Preston to Cliftonville. This line will form a direct cut for the express trains from London to Worthing, Shoreham, and Portsmouth, without going into the Brighton Terminus. The works, which comprise a tunnel 600 yards long, and an extensive cutting through the chalk, &c., are to be pushed on with immediately, and finished as quickly as possible.

Lawless House-building at North Shields. The *Shields Gazette* has a leading article in reference to the proceedings at the last meeting of the Borough of Tynemouth Corporation. According to Councillor Baker, "houses are sometimes half and sometimes wholly built" before official sanction is given for the work; and yet it would seem that in not a single instance has the wrongdoer been punished.

An Industrial Dwellings Company for Derby.—A meeting of gentlemen favourable to the formation of an association having for its object the erection of improved dwellings for the artisan and labouring classes was held in the Grand Jury-room, Town-hall, Derby, on the 8th inst. Resolutions were unanimously passed approving of the formation of an association to be called the Midland Industrial Dwellings and Sanitary Association, Limited, with a capital of 100,000*l.*, in shares of 5*l.* each, and also requesting certain gentlemen to act as directors and vice-presidents.

The Mersey Dock Board.—It has been settled by arbitration that the sum of 310,000*l.* is to be paid to the Liverpool Corporation by the Mersey Docks and Harbour Board for a piece of land which has been acquired by the Board from the Corporation. This is at the rate of 2*l.* 17*s.* 7*d.* per yard. The *Liverpool Post* states that, with the exception of the Duke's Warehouse and the George's Pierhead, the Docks and Harbour Board are now the proprietors of all the land on the Liverpool side of the river from one end of the town to the other.

New Buildings at Kew Gardens.—We learn that under the superintendence of Her Majesty's Office of Works some new buildings and extensions are about to be made at the Royal Botanical Gardens at Kew, for the reception of specimens of plants and flowers, and that for this purpose the west wing of the Herbarium, adjoining the entrance to the gardens, is about to be demolished. Preparatory to the old building being removed and the works commenced the materials were publicly sold last week by Messrs. Dawson & Co., of Norfolk-street, Strand.

Ely Cathedral.—At a meeting of the sub-committee, held at Cambridge on the 5th inst., the plans of Sir Gilbert Scott for restoring the exterior of the octagon and lantern, at a cost of about 3,000*l.*, were approved for submission to the general committee on the 7th proximo. It was stated that about 500*l.* are still required to enable the whole of this work to be completed.

The Walker Art Gallery, Liverpool.—The general committee appointed to make arrangements for the opening of the Walker Art Gallery, Liverpool, have issued a circular asking for pictures for the loan exhibition which is proposed to be held at the inauguration of the building. It is proposed that the exhibition shall open during the month of September, and remain open to the public for about two months.

The Restoration of Steetley Chapel.—Mr. Pearson, A.R.A., has undertaken to prepare the plans for the restoration of this valuable and picturesque relic, which is to be utilised as a church. We mentioned the proposal some months since, and a vigorous protest against it was made by a correspondent.

Wiltshire Archæological and Natural History Society.—At a committee meeting of this Society held at the Museum in Devizes, a few days since, it was definitely fixed to hold the annual meeting for this year at Salisbury, in the early part of the month of August, under the leadership of the new president of the Society, Sir John Lubbock.

Worcester Market Cross.—It has been suggested that Worcester Market Cross should be restored as a memorial of the late Lord Lyttelton.

TENDERS

For the erection of a detached house and stabling on the Manor Park Estate, Caterham Valley, Surrey. Mr. Richard Martin, architect. Quantities supplied by Mr. John Glenn:—

	House.	Stabling.
Blott	£4,850	£640
Newman & Mann	4,775	635
Langmead & Way	4,705	620
Willson, Brothers	4,690	610
Bangs & Co.	4,609	609
Patman & Fotheringham	4,635	600
Cooper	4,490	608
Ward	4,171	574
Jarrett (accepted)	3,925	560

For taking down and rebuilding schools, Wood-street Chapel, Walthamstow. Mr. J. H. Swan, architect. Quantities by Mr. Macfee:—

Wells	£2,370 0 0
Reed	2,330 0 0
Turner	2,260 0 0
Fuller	2,143 0 0
Tubby	2,050 0 0
Morter	1,987 0 0
Tarrant	1,948 0 0
Deards (accepted)	1,898 0 0
Read	1,766 0 0

For new Almshouses, Worcester. Mr. Aston Webb, architect. Quantities by Messrs. Selby & Rogers:—

	Six Blocks.	Five Blocks.
Treasure & Son	£5,095	£4,295
Nixon & Son	3,890	3,299
Kendrick	3,827	3,227
Collins & Cullis	3,750	3,125
Dixon	3,600	2,980

Amended and reduced tender for the five blocks:—
Dixon (accepted) £2,862 0 0

For house, shop, and workshops, Rose Mount, Oxton, for Mr. W. Male. Mr. C. W. Harvey, architect. Quantities by Messrs. Selby & Rogers:—

Forde	£1,980 0 9
Bleakley	1,911 0 0
Cubbins	1,860 0 0
Povall	1,766 0 0
Hughes	1,588 0 0

For stables, &c., at Letts' Wharf, Lambeth, for the Commissioners of Sewers of the City of London. Mr. W. Haywood, architect. Quantities by Mr. D. Cubitt Nichols:—

Mowlem & Co.	£16,500 0 0
Downs	15,920 0 0
Gammon	15,706 0 0
Marsland	15,570 0 0
Linzell	15,550 0 0
Waldram & Co.	15,310 0 0
Wilson, Brothers	14,970 0 0
Chappell	14,939 0 0
Stevenson	14,352 0 0
Little	14,340 0 0
Bracher & Son	14,000 0 0
Perry & Co. (accepted)	13,379 0 0

For alterations to the Three Colts public-house, Cambridge-road, Mile-end, for Mr. Harwood. Mr. W. Munday, architect:—

Forrest	£924 0 0
Wood	893 0 0
Judd & Hawkings	789 0 0
Saunders	750 0 0
Hearle & Son	623 0 0
Stamp & Bowtle	593 0 0

For pulling down three houses and building two on the site, for Mr. Tyler. Mr. J. Harris, architect:—

Killby	£1,459 0 0
Wood	1,344 0 0
Judd & Hawkings	1,313 0 0

For the erection of stabling and conversion of house into a warehouse, at Brentford, for Messrs. Carter, Paterson, & Co. Mr. Wm. Eve, architect:—

Barnes	£1,130 0 0
Brunsden	925 0 0
Sheffield	864 0 0
Nye	823 0 0
Sweet (accepted)	782 0 0

For alterations at 72, Marine-parade, Brighton, for Mr. J. W. Williams. Mr. A. R. Farr, architect:—

Anscombe	£765 0 0
Garrett Brothers	745 0 0
Howard (accepted)	725 10 0

For the restoration of parish church, River, near Dover. Mr. B. J. Reeve, architect. Quantities supplied:—

Bourne	£734 0 0
Moody	714 14 0
Butler	689 0 0
Matthews (too late)	655 0 0
Brooks & Slade	650 0 0
Prebble	589 0 0
Webster	580 0 0
R. & D. Baker	580 0 0
Richardson & Son	543 0 0
Humphrey	532 0 0
Holdom (accepted)	515 0 0
Dowle	484 5 0

For villa residence and front boundary wall in Leonard-road, Folkestone. Mr. B. J. Reeve, architect. Quantities supplied:—

Brooks & Slade	£1,057 0 0
Webster	1,050 0 0
Prebble	1,014 0 0
R. & D. Baker	998 0 0
Holdom	977 0 0
Dunk (accepted)	968 0 0

For stable, coach-house, hen-house, walls, and entrance-gates to East Cliffe Lodge, Folkestone. Mr. B. J. Reeve, architect. Quantities supplied:—

Dunk	£227 0 0
Holdom (accepted)	200 0 0

For drainage works, Trowbridge, Wilts:—

Cowdry & Sons	£1,415 18 6
Greenwood & Dovenor	1,395 0 0
Haines	1,350 0 0
Botterill & Co.	1,323 0 0
Brook & Bruce	1,216 0 0
Bugbird	1,151 0 0
Bibsey	1,070 0 0

For two warehouses in Rutland-street, Leicester. Mr. A. Hardy, architect. Quantities by Mr. G. Jackson:—

Lindley	£6,486 0 0
Loveday	6,450 0 0
Bland & Son	6,229 10 0
Billington	6,045 0 0
Barnett	6,005 0 0
Kellett	5,945 0 0
Bass & Hodgkins	5,875 0 0
Stirk	5,870 0 0
Hall	5,855 0 0
Gilbert & Pipe (accepted)	5,840 0 0

For (R.C.) church, presbytery, and schools, Market Harborough. Mr. C. G. Wray, architect. Quantities by Messrs. Linsdell & Giffard:—

Parnell & Son	£5,761 0 0
Bayes Bros. & Allen	5,497 0 0
Stamp & Bowtle	5,358 0 0
Jennings	5,345 0 0
S. & W. Pattinson	5,000 0 0
Halliday & Cave (accepted)	4,900 0 0
Margetts	4,658 0 0
Conquest	4,551 0 0
Bassett	4,438 0 0

For the erection of a residence and offices at Redlands, Reading, for Mr. C. J. Andrews, J.P. Mr. W. Ravenscroft, architect. Quantities by Mr. H. Cooper:—

Timewell*	£5,530 0 0
Silver & Son	4,870 0 0
George Bros. (too late)	4,540 0 0
Hill, Higgs, & Hill	4,415 0 0
Battley	4,400 0 0
Woodbridge	4,370 0 0
Searle	4,305 19 0
Nye	4,299 0 0
Staines & Son	4,244 0 0
Jarrett	4,100 0 0
Deacon	4,095 0 0
Rider & Son (accepted)	3,787 0 0
Croxford & Co.	3,571 0 0

* We are asked to say that Mr. Timewell's estimate, but for a mistake in the figures, would have been 4,530*l.*

For house to be built at Bromley, Kent, for Mr. W. Barnard. Mr. H. T. Gordon, architect:—

Browne & Robinson	£3,303 0 0
Manley & Rogers	3,100 0 0
Little	3,064 0 0
Williams & Son	3,030 0 0
Kerry	2,973 0 0
Shapley	2,875 0 0
Crabb	2,845 0 0

For schools, Bredon, Worcestershire, for Mr. Chas. S. Hudson. Messrs. Yeates & Jones, architects. Quantities supplied:—

Warner	£480 0 0
Collins & Cullis	470 0 0
Beard	465 0 0
Williams & Buckle	430 10 0
Walker & Wilkes*	420 0 0

* Accepted after slight alteration in construction.

For alterations and additions to schools, Pheasant-street, Worcester, for the St. Martin's Schools Committee. Messrs. Yeates & Jones, architects. Quantities supplied:—

Kenderick	£341 12 0
Beard	324 0 0
Bourne	309 0 0
Dixon (accepted)	280 0 0

For cricket pavilion, Boughton, Worcester, for the Worcester County Cricket Club. Messrs. Yeates & Jones, architects. Quantities supplied:—

Warner	£468 0 0
Kenderick	440 10 0
Bourne	426 0 0
Dixon (accepted)	365 0 0

Accepted for warehouse, for Mr. E. Awmack, Broad-street, Reading. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Bricklayer, Slater, Mason, &c.

Searle	£282 7 7

Carpenter and Joiner.

Sheppard	291 7 0

Plumber, Painter, and Glazier.

Gocher	73 0 0

Accepted for additions to corn stores, Reading, for Mr. E. G. Oakshott. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Turney	£450 0 0

Accepted for new branch bank, Reading, for the London and County Banking Company. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Wheeler Bros.	£4,585 0 0

Accepted for first portion of work for new premises for Mr. Joseph Long, London-street, Reading. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Bricklayer, Mason, Carpenter, &c.

Filewood	£1,599 0 0

Smiths and Founders.

Hart & Son	158 18 0

Plumber, Painter, and Glazier.

Harris	295 0 0

Accepted for new drying building, Reading, for Messrs. Sutton & Sons. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Higgs	£597 0 0

For rebuilding Nos. 35, 36, 37, and 38, Great Marlborough-street, W., for Messrs. Metzler & Co. Messrs. Lee Bros. & Pain, architects. Quantities supplied:—

Trollope & Sons	£22,840 0 0
Simpson & Sons	22,830 0 0
Jackson & Shaw	21,355 0 0
Brass	21,259 0 0
Bywaters (accepted)	20,996 0 0

For the erection of Emmanuel (iron) Church, Wimbledon, exclusive of foundations and warming. Mr. T. S. Archer, architect:—

Kent	£2,000 0 0
Townsend (accepted)	1,990 0 0

For the erection of plant houses at Kelsey Manor, Beckenham. Mr. T. S. Archer, architect:—

Messenger (accepted)	£630 0 0

For alterations and additions to Raymead, Hendon Park, Hendon. Mr. T. S. Archer, architect:—

Meadows (accepted)	£248 0 0

For the erection of a house for Mr. F. W. W. Topham, Hampstead. Mr. T. K. Green, architect:—

	House.	Conservatory.
Longmire & Burge	£2,490 0 0	— — —
Newman & Mann	2,334 0 0	£90 0 0
Baker	2,329 0 0	86 0 0
Browne & Robinson	2,280 0 0	65 0 0
Scrivener & White	2,275 0 0	82 0 0
Shepherd	2,195 0 0	57 0 0
Manley & Rogers	2,190 0 0	77 0 0
Benstead & Sons	2,185 0 0	59 0

For the erection of a warehouse, Old-street, E.C. Mr. R. J. Worley, architect:—

Falkner	£1,197 0 0
Catlan (too late)	1,050 0 0
Rudkin	1,020 0 0
Smyth	997 0 0
W. & F. Croaker	927 0 0
Beeton (withdrawn)	675 0 0

For the erection of stabling, Hall-street, City-road. Mr. R. J. Worley, architect:—
Beeton (accepted) £1,000 0 0

For engines, boilers, pumps, tanks, &c., at Aylesbury Sewage Works, for the Native Guano Company. Contract No. 2. Messrs. T. & C. Hawksley, engineers:—
Wurr & Lewis accepted.

For five villa residences at Stockwell End, Tettenhall, for Mr. G. H. Perry. Mr. J. R. Veall, architect:—
Lovatt (reduced estimate, accepted) £6,650 0 0

For restoration of parish church, Nolton, Pembrokeshire. Mr. E. H. Lingen Barker, architect:—
Evans £503 8 5
Thomas 485 0 0
James 479 10 0
Lloyd & Roberts 394 17 0
Jones & Jenkins 373 15 0

For billiard-room, stock-rooms, and other works at the Angel Hotel, Salisbury, for Messrs. George Gale & Co., Mr. F. Bath, architect. Quantities by the architect:—
Harris £950 0 0
Tryhorn 934 10 0
Young 922 0 0
Harris & Dolman (accepted) 891 18 5

For new tavern in Merton-road, Tooting, Surrey, for Messrs. Thorne. Mr. Lynes, architect:—

	House.	Stable.
Richards	£2,510 0 0	£488 0 0
Ellis	2,249 0 0	380 0 0
Tilly	2,220 0 0	386 0 0
Parsons	2,170 0 0	375 0 0
Lathey Bros.	2,063 0 0	347 0 0
Kirk	1,977 0 0	356 0 0

For alterations and additions at New Cross Cottage, Oatlands Park, Surrey, for Mr. G. T. Woodrooffe. Mr. J. Jeffkins, architect:—
Brown & Sons £1,165 0 0
Lee 850 0 0

For additions to house, Oatlands Park, Surrey, for Mr. Edward Weatherby. Mr. J. Jeffkins, architect:—
Lee £990 0 0
Brown & Sons 810 0 0

For rebuilding the Surrey Hall Hotel, Clewer, near Windsor, for Mr. Pennicott. Mr. W. Sim, architect. Quantities by Messrs. Herring & Shayler:—
Browne & Robinson £2,639 0 0
Revell 2,532 0 0
Hollis 2,294 0 0
Carless 2,271 0 0
Pocock 2,270 0 0
Ebbs 2,175 0 0
Deacon 2,148 0 0
George 2,041 0 0

For new vestry at Immanuel Church, Streatham. Messrs. George & Peto, architects. Quantities by Messrs. Stoner & Sons:—
Bassett £636 0 0
Mason 629 0 0
Deacon (accepted) 579 0 0

For farm buildings and cottage, at Sparks Farm, Cuckfield, Sussex, for Mr. W. Sergison. Mr. Holloway, architect:—

	Farm Buildings.	Cottage.
Anscomb	£590 0 0	£395 0 0
Deacon	585 0 0	428 0 0
Norris	544 7 0	365 0 0
Knight	520 0 0	355 0 0

For mahogany fittings, painter's and decorator's work, to completion of York-road, Battersea, Branch of the West London Commercial Bank. Mr. C. Stimpson, architect:—
Smith £397 14 0
Luff & Co. 318 0 0
Turtle & Appleton (accepted) 292 0 0

TO CORRESPONDENTS.

W. G. S.—W. C.—F. W.—L.—J. D.—S. S.—H. H.—C. G. W.—W. G.—C. J.—Rev. E. H.—J. S.—J. H. B.—S. S.—H. P.—G. J.—H. C. S.—Mr. E.—T. B.—P. & W.—J. H.—W. R. G.—C. E. F.—J. L. H. S.—R. P.—J. T.—H. H. S.—M. D.—R. & S.—J. K.—Mr. V.—E. L. B.—T. B. D.—J. L.—F. B.—L. Bros.—W.—J. J.—W. P.—G. L. W.—F. C. (No).—R. & M. (next week).—J. T. 'compelled uniformly to decline).—T. D. (send us decision).

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The ANNUAL MEETING of this Institute will be held at the MANSION HOUSE, on MONDAY, the 29th inst. by kind permission of the Right Hon. the Lord Mayor, who will take the Chair at THREE p.m. The following Noblemen and Gentlemen among other Friends of Industrial Education, intend being present:—The Earl of Rosebery, Earl Fortescue, Sir John Lubbock, bart. M.P.; Sir Harcourt Johnstone, bart. M.P.; Right Hon. Cowper-Temple, M.P.; Samuel Morley, esq. M.P.; Thomas Brassey, esq. M.P.; William McArthur, esq. M.P.; Major-Gen. Marriott, C.S.I.; Professor Leone Levi; Professor James Stuart, M.A. (Cambridge); Professor Kennedy, (Univ. Coll.), Hodgson Pratt, esq.

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[CONTRACTS—*continued from* p. ii.

TO STEAM JOINERY PROPRIETORS.—WANTED ESTIMATES for first-class JOINERS' WORK.—Address, in the first instance, to No. 450, Office of "The Builder."

TO BUILDERS.—TENDERS are required for the RESTORATION of the PARISH CHURCH of Birt's Norton, near Tewkesbury, Worcestershire. The plans, specification, and conditions of contract can be seen at the Rectory, Birt's Norton, from MAY 18th to JUNE 1st inclusive, and Tenders to be sent by post to the undersigned on the 1st of JUNE. The Architects will reply to any inquiries addressed to them. No pledge is given to accept the lowest or any Tender.
T. D. BARRY & SONS, Architects,
Liverpool.

GRAINING.—ESTIMATE WANTED, for WORK required to be done at once.—Apply to S. BARNETT, Builder, 15, Gore-crescent, Victoria Park, E.

BURSLEM LOCAL BOARD.—NEW MARKET HALL, SHOPS, and OFFICES.—The Burslem Local Board are prepared to receive TENDERS for the following WORKS:—
CONTRACT No. 1.—The Erection of a Covered Vegetable Market, Six Shops, Offices, and other Works.
CONTRACT No. 2.—The Construction of an Iron Roof, with Wrought-iron Arched Principals, Purlins, &c. and Cast-iron Columns.
The drawings, specification, and conditions of contract can be inspected, and forms of Tender, with bills of quantities, obtained on application at this Office on and after the 24th instant, on payment of 2l. 2s. which sum will be returned on receipt of a bonâ fide Tender. Sealed Tenders, addressed to the Chairman of the Markets Committee, and endorsed "Tender for Market Hall, Contract No. " must be sent to me at or before THREE p.m. on the 8th day of JUNE next. The Board do not bind themselves to accept the lowest or any Tender.—By order,
E. M. RICHARDS, Surveyor to the Board.
Surveyor's Office, Town-hall, Burslem, May 12th, 1876.

MINSTER-IN-SHEPPEY SCHOOL BOARD.—To BUILDERS.—The Minster-in-Sheppey School Board are prepared to receive TENDERS for the ERECTION of Two Sets of SCHOOL BUILDINGS at Minster Village and Sheerness. Persons desirous of Tendering may inspect the drawings, specifications, and quantities at the Office of the Board, Trinity-road, Sheerness. Tenders to be delivered at the Office of the Board, on or before WEDNESDAY, the 7th day of JUNE, 1876, and not later than SIX o'clock in the evening of that day. The Board do not bind themselves to accept any Tender, nor to pay any expense connected with any.—By order, EDWARD FELKIN, Clerk to the Board.
Trinity-road, Sheerness, May 24, 1876.

TO BUILDERS and CONTRACTORS.—The Northamptonshire Banking Company are prepared to receive TENDERS for the ERECTION of NEW BANK PREMISES, at Kettering. Plans and specifications may be seen, and bills of quantities obtained, on application to the Architect, Mr. R. W. JOHNSON, George-street, Kettering, on and after WEDNESDAY next, the 31st day of MAY. The lowest or any Tender not necessarily accepted.

KENT.—To BUILDERS.—Persons willing to TENDER for the ERECTION of a CHAPEL at the Kent County Prisons, Maidstone, may see the plans and specification of the proposed works, and obtain all necessary particulars, at the Office of the County Surveyor, West Borough, Maidstone, between the hours of TEN and FIVE. Sealed Tenders are to be delivered at the Office of the Clerk of the Peace, Sessions House, Maidstone, on or before WEDNESDAY, JUNE 21st, 1876, endorsed "Tender for Building Chapel." The Justices do not bind themselves to accept either the lowest or any other Tender, and security will be required for the proper performance of the contract.
F. RUSSELL, Clerk of the Peace for Kent.
Maidstone, May 25th, 1876.

KENT.—To CONTRACTORS and BUILDERS.—Persons willing to TENDER for PULLING DOWN a BRIDGE known as Bid Bridge, and situate between Hildenborough and Leigh, near Tonbridge, and RE-BUILDING the same, may see the plans and specification of the proposed Works, and obtain all necessary particulars, at the Office of the County Surveyor, West Borough, Maidstone, between the hours of TEN and FIVE. Sealed Tenders are to be delivered at the Office of the Clerk of the Peace, Sessions House, Maidstone, on or before WEDNESDAY, JUNE 21st, 1876, endorsed "Tender for Rebuilding Bid Bridge." The Justices do not bind themselves to accept either the lowest or any other Tender, and security will be required for the proper performance of the Contract.
F. RUSSELL, Clerk of the Peace for Kent.
Maidstone, May 25th, 1876.

DARTFORD SCHOOL BOARD.—To BUILDERS and CONTRACTORS.—The Dartford School Board is prepared to receive TENDERS for the ERECTION of NEW SCHOOLS, to accommodate 333 children, on the proposed site in Heath-street, Dartford. Plans and specification may be seen, and bills of quantities obtained, between the hours of TEN a.m. and FIVE p.m. at the Office of the Board (No. 63, High-street, Dartford), and at the Office of Mr. W. H. POWELL, Architect, No. 13, Mecklenburgh-square, London, W.C. (from whom all further information may be obtained), on and after MONDAY, the 29th MAY inst. Tenders sealed, and endorsed "Tenders for New Schools, Heath-street, Dartford," must be delivered to me, the undersigned, at or before TWO o'clock on THURSDAY, the 8th day of JUNE next. The Board does not bind itself to accept the lowest or any Tender.
J. RICKETT, Clerk to the Board.
Dartford, 10th May, 1876.

GREENWICH DISTRICT.—To PAVING CONTRACTORS.—The Board of Works for the Greenwich District is prepared to receive TENDERS for PAVING the FOOTWAYS of Rokeby-road and Upper Craufield-road, from Wickham-road to Breakspears-road, in the parish of St. Paul, Deptford, with 2½-inch tooled York Stone and Purbeck Kerb, and for MAKING UP the ROADWAYS with Hard Core and Kentish Ragstone, and Paving the Channels with Aberdeen Granite Cubes; and for Paving the Footways of the portion of the Brockley-road in the parish of St. Paul, Deptford, extending from Norman Lodge, southwards, to the boundary of the parish, with 3-inch Tooled York Stone and Aberdeen Granite Kerb, and for making up the Roadway with Guernsey Granite and Paving the Channels with Aberdeen Granite Cubes; and other Works, according to specifications.
The specifications and plans can be seen, and particulars obtained, at the Offices of the Board, in Church-street, Greenwich, between TEN and FOUR o'clock (on SATURDAYS between TEN and ONE). A separate Tender must be sent in for the Works in each street, sealed up and endorsed with the name of the street to which it refers, and all Tenders must be sent in to the Board's Offices, as above, before FOUR p.m. on WEDNESDAY, the 14th JUNE next, and parties Tendering, or their agents, should attend at the said Offices at HALF-PAST SEVEN p.m. on that day. The Board does not bind itself to accept the lowest or any Tender.
J. SPENCER, Clerk of the Board.
Greenwich, May 25th, 1876.

ASTON and HANDSWORTH COMBINED SEWERS.—To CONTRACTORS.—The Manor of Aston Local Board hereby give notice that they are desirous of receiving TENDERS from competent persons willing to enter into a contract for the CONSTRUCTION of the following Works:—
Contract No. 1, comprising 5,040 feet run or thereabouts of BRICK-BARREL SEWER, 4 feet 6 inches diameter; 1,267 feet run or thereabouts of Brick-barrel Sewer, 3 feet diameter; 4,777 feet run or thereabouts of 2-feet 6-inches by 3 feet 9-inches Egg-shaped Brick Sewer; 8,660 feet run or thereabouts of 2-feet 8-inches by 4-feet Egg-shaped Brick Sewer; 119 feet run or thereabouts of treble row of cast-iron Pipe Sewer, 3 feet diameter; together with Manholes, Lamp-holes, Ventilators, Gullies, Storm-overflows, Bell-mouthed Junction, River Crossing, Retaining Walls, Provisional Outfall, Finstocks, Flushing Gates, Making-up Roads, Curbing and Channelling, and other works incidental to the above.
The plans, sections, and drawings may be seen at the Office of Mr. WILLIAM HUMBER, the Engineer, No. 20, Abingdon-street, Westminster, London, and at the Offices of the Board, Six Ways, Aston-juxta-Birmingham, on and after the 29th day of MAY instant, between the hours of TEN a.m. and FOUR p.m. and on SATURDAYS between the hours of TEN a.m. and ONE p.m. where copies of the specification, conditions, schedule, bills of quantities, and form of Tender may be obtained upon application and payment of five guineas, which said sum will be returned upon the receipt of the said specification, conditions, schedule, bills of quantities, and form of Tender being filled in, and signed, the same being a bonâ fide Tender, sealed and endorsed "Combined Sewerage Works, Contract No. 1," to be delivered at the Office of the Board on or before TWELVE o'clock at Noon on MONDAY, the 21st day of JUNE next. The Board do not bind themselves to accept the lowest or any Tender.
JOSEPH ANSELL, Clerk to the Board.
Wordsley-place, Witton-road, Six Ways, Aston Manor, Warwickshire. May 24th, 1876.

WOOD PAVING.—To LOCAL BOARDS, VESTRIES, CORPORATIONS, and OTHERS.—For particulars as to WOOD PAVING, laid complete by the Cheapest and Best Method, apply to JOSEPH S. GABRIEL, Grellier's Wharf, Belvedere-road, Lambeth, where Estimates for same may be had on application.